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E FIELD SESSION OF THE SCHOOL OF AMERICAN ARCHEOLOGY[1]

'HE School of American Archeology was ated in 1907 by the Council of the Archeo- ical Institute of America, with the object organizing and giving direction to the dy in America of this and cognate nches, constituting the science of man in broader sense—anthropology. It is con- led by a managing committee appointed by institute, consisting of thirty-three prom- nt citizens and scientists of Canada, the ited States and Mexico; and its field of ac- ty embraces those countries, with the addi- n of Central America. After canvass of ious localities the school was located at nta Fe, New Mexico, because it is in the rt of a vast region of prehistoric cultures vards of 1,000 miles long by 800 miles wide, ending from Utah to southern Chihuahua. thus dominates a typical field for the in- tigation of the character and probable gin of the native races of this continent. e advantage to the school of having such environment of original material for study bvious.

As a further addition to the facilities of the ool, the territory of New Mexico, estab- ned at Santa Fe the Museum of New Mex- , to be administered by the director of the ool, and for that purpose donated the his- ic palace of the governors, one of the old- public buildings in the United States, with annual fund for its maintenance. This s now been partially installed, and was mally opened to the public August 20; it l furnish collections, laboratories, lecture and research rooms, for the current work the school.

The general plan of the school contempl that a portion of each year's work shall done in the field, in direct contact with th things to be studied. The first fully orga ized session under this plan was held during the past summer, in the region tributary to Santa Fe, under the personal direction of Dr. Edgar L. Hewett, Director of American Archeology, and of the school. Four months were devoted to the general work, distributed as follows: One month to field work in the Ojo Caliente Valley; two months to school and field work at the Rito de los Frijoles; one month to field work in the Jemez Valley. The United States Bureau of Ethnology collaborates with the school during four months of field work and two months for preparation of reports, under the joint authority of the chief of the bureau and the director of the school. Mr. F. W. Hodge, chief of the bureau under the title of ethnologist in charge, took part in the work personally during the latter part of the season. The bureau, however, has nothing to do with the administration or maintenance of the school—the collaboration above mentioned being arranged for mutual benefit, and to avoid duplication of work in the field.

The school is now permanently established. Sessions will be held annually at different points within the general region, to be designated from time to time according to the localities under investigation. As the session recently held fairly illustrates the practical

[1] Held near Santa Fe, N. M., June–September,

working of the school as organized, some account of it will be of interest.

The members of the *Staff of Research and Instruction* were: Dr. Edgar L. Hewett, director (University of Geneva); Mr. John P. Harrington, ethnology and linguistics (Stanford, Berlin, Leipzig); Mr. Sylvanus G. Morley, archeology (Harvard).

Special Assistants: Mr. Junius Henderson, geology, zoology (University of Colorado); Mr. W. W. Robbins, botany (University of [illegible]orado).

[illegible]pecial lectures were given by Mr. Hodge, [illegible]f of the Bureau of Ethnology, Professor [illegible]urdy, of Yale, and Mr. K. M. Chapman, [illegible]the school.

The actual working force consisted of the [illegible]rector, Mr. Hodge and twelve assistants, including the regular members of the school staff, and a number of teachers and students from the universities of Utah, Colorado, Cornell, Denver and Oxford, England. A well-equipped library, with study and lecture tent and awnings, was provided. Lectures and field excursions, under direction of some of the staff, were held at stated hours; these were regularly attended by many visitors, including tourists and travelers from various parts of the country, and prominent officials and citizens of Santa Fe. Many of these came out of curiosity, but availed themselves of the facilities afforded by the lectures and excursions, which were free to all who were interested. The locality is about thirty-five miles by road from Santa Fe, reached by carriage in a day's drive.

The line of research followed embraced the usual archeological work, having for its aim the study of the native races of America, limited at present to those of fixed habitations. For this there are two sources of knowledge: (1) The original, from the prehistoric ruins, representing the isolated Indian culture unmodified by contact with other races; and (2) secondary, from the existing Indians of contiguous or related territory, who must be studied for the light they throw on the ancient cultures. Under the plan developed in the school, these problems are attacked with aids derived from several branches of scie[illegible]n some of which at first thought may no[illegible] considered germane to the subject; but a su[illegible]gestion of the reasons for employing them w[illegible] show their relevancy. Under the general he[illegible] of ethnology we may have:

1. *Linguistics.*—The languages of the livi[illegible] Indians of the region furnish trails leading [illegible] knowledge of many things we need to kn[illegible] concerning the ancient peoples—their know[illegible]edge of places, geographical limits, the e[illegible]ments, constellations; their ideas on myt[illegible] legends, religion; their views of life and t[illegible] hereafter; their social organization and m[illegible]terial culture; the whole range of what th[illegible] make and do, and why.

2. *The Natural History of the Region.*—(*Geology.*—The settlement of the whole gre[illegible] southwest region of 1,000 by 800 miles w[illegible] directly controlled by the geological structu[illegible] of the country. It determined the location [illegible] the habitations; the building material a[illegible] character of the houses, from the caves wo[illegible] by the winds out of soft tufaceous deposi[illegible] enlarged by scratching with stone tools, [illegible] additions and enlargements with shap[illegible] blocks upon the talus, leading later to the [illegible]tached houses as population increased, a[illegible] finally to the Pueblo houses of to-day. Th[illegible] are ethno-geological facts closely related [illegible] the questions in hand.

(*b*) *Vegetation.*—Plant life powerfully [illegible] fluenced the culture of the Indian. He ma[illegible] use of a large number of them, for their fo[illegible] value, their medicinal properties real and su[illegible] posed, and for superstitious reasons. He v[illegible] in this region necessarily an agriculturist, [illegible] pending upon vegetation for his subsiste[illegible] far more than the plains Indians, who h[illegible] animal food in abundance. To understa[illegible] this properly, exact knowledge of the plant l[illegible] of the region is necessary, together with [illegible] probable effect upon it of great cycles of [illegible]matic change. Scientific knowledge of [illegible] present day must be connected with what [illegible] Indians knew of the plants. To know exac[illegible] what plant was used by them, for a cert[illegible] purpose, is an ethno-botanical fact that [illegible] pertinent.

A
nal Life.—An accurate knowledge
his, both past and present, is important
ts bearing upon the food-supply, and the
fs of the Indians concerning the animals;
were endowed by them with a great va-
of attributes, some of them human, be-
in which greatly affected the life and
rstitions of the people. Therefore the
ıal life of the region must be studied
ıtifically in order to know it accurately
elves, and we study it ethnologically to
ı the beliefs of the Indians connected with
ve correlate the two in search of ethno-
ɔgical data.

ɔordinated with these, in such a way as to
ı definite and manageable units, the ac-
ulation of which is expected to furnish a
l basis for future generalizations, there
rovided—

An Archeological Survey of a Definite
ion.—This embraces the study of the dis-
ution of the ruins, relating to the social
ınization and life of the people; the plan
construction of the buildings, showing
r home life and religious practises; the
ıestic utensils and tools, indicating their
ıstrial development; decoration, showing
origin and progress of their ideas of de-
ı and ornament, bearing upon the evolu-
ı of beliefs and habits of thought.

ll these lines of research lead up to the
t important phase of the inquiry, viz.,

. *Psychology.*—For it is the human mind
t we are studying, and the ultimate aim
these correlated investigations is to find
how the mind of man has been influenced
his environment; how his beliefs and life
e been created, modified, continued, or de-
ɔyed by his physical surroundings.

The methods adopted for carrying out the
egoing scheme, and which were successfully
ctised during the recent summer session,
y be summarized as follows:

1. Excavations of the designated ruins, systematically made under proper supervision; insuring the adequate scientific record of all facts disclosed, care of the objects discovered, and preservation of the structures for the use of future students.

2. Special investigations upon the collateral subjects above indicated, made by persons thoroughly qualified, within the definite region under consideration. These embraced the survey and mapping of the area; and the geology, botany and zoology, studied in direct connection with the linguistics of the existing Indians derived largely from the same stock as the ancient dwellers. This was accomplished by taking a number of intelligent Indians into the field, and learning from them at first hand the original names of all the objects studied, their uses, and the beliefs and traditions concerning them.

3. Daily class excursions under instruction, bringing the students from time to time into direct contact with the researches mentioned in the last two paragraphs, thus affording opportunity for study where the things are, and for discussion in their presence.

4. Facilities for direct comparison of pertinent literature, by means of a library on the spot.

5. Intelligent presentation of the results of the work, and of related questions, by means of daily lectures, with opportunity for inquiry and discussion following them.

The foregoing program of field study will be followed by work at the museum during the year, where the material obtained in the field will be digested, and the results prepared for publication. This will include, among the special features, phonographic and kymographic studies of languages now rapidly disappearing, thus securing mechanically accurate records for future use.

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THE CORRELATION OF MAYA AND CHRISTIAN CHRONOLOGY

One of the most important problems in American Archaeology is the correlation of the Maya system of counting time with our own. Long before the first appearance of the white man in the Western World, the Maya race of Central America and Southern Mexico had developed an accurate system of reckoning time and recording events. So accurate indeed is this aboriginal chronology that were it possible to translate a single Maya date into the corresponding notation of our own calendar, the age of all the great cities of the Maya culture would be known, probably more exactly than the age of Nineveh, Babylon, or even Rome. Already the broader lines of Maya History have been traced. The general northward trend of migration within the area has been established. The rise and fall of the larger cities relative to each other have been worked out. Even the periods of time during which they were occupied, expressed in Maya notation, have been reduced to years, as we understand that term. There remains, however, the much more difficult task of bringing Maya Chronology into accordance with our own, and of changing the dates of the one system into the corresponding dates of the other. To accomplish this, some kind of an American Rosetta Stone is required, which will set forth the Maya equivalent of a known date in our own calendar. The nearest approach to such a chronological key is that class of manuscripts known as The Books of Chilan Balam.

The Books of Chilan Balam were copied or compiled in Yucatan by natives during the sixteenth, seventeenth, and eighteenth centuries, from much older manuscripts now lost

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or destroyed. They are written in the Maya language in Latin characters, and treat, in part at least, of the history of the country before the Spanish Conquest. Each town seems to have had its own book of Chilan Balam, distinguished from others by the addition of the name of the place where it was written, as: The Book of Chilan Balam of Mani, The Book of Chilan Balam of Tizimin, and so on. Although much of the material presented in these manuscripts is apparently contradictory and obscure, their importance as original historical sources cannot be overestimated, since they constitute the only native accounts of the early history of the Maya race, which have survived the vandalism of the Spanish Conquerors. Of the sixteen Books of Chilan Balam now extant, only three, those of the towns of Mani, Tizimin, and Chumayel, contain historical matter. These have been translated into English, and published by Dr. D. G. Brinton under the title of "The Maya Chronicles." This translation with a few corrections has been freely consulted in the following discussion.

In all, there are five of these chronicles: one from the Mani manuscript, one from the Tizimin manuscript, and three from the Chumayel manuscript. Each of these chronicles contains a more or less consecutive arrangement of twenty-year periods called, in Maya, katuns, after each one of which is set down the event or events that occurred during its course. These accounts are, in reality, little more than chronological synopses of the history of the country. They are called in The Books of Chilan Balam variously: "The Record of the Katuns," "The Record of the Count of the Katuns," "The Arrangement of the Katuns" and "The Order of the Katuns." These names suggest, what the manuscripts are in fact found to contain, sequences of katuns or twenty-year periods during which happened the events recorded.

When it became necessary to fix an event more closely than as occurring within a period of twenty years, the division of time next smaller than the katun was also used. This was called by the Mayas the tun, and contained 360 days, roughly corresponding to our own year. The statement that an event occurred in any given tun of a katun fixed that event to a definite year within a period of twenty years. Just as we might

describe the Discovery of America as occurring in the second year of the tenth decade of the fifteenth century.

Katuns were named after the days with which they began, or, as some contend, after the days with which they ended. This difference of opinion, however, is merely a quibble as to the starting-point, and does not affect the sequence of the katuns, which is the same in either case. In this discussion, katuns are regarded as having been named after the days with which they began. The Maya katun always began with a day called Ahau, and the different katuns were distinguished from each other by a numerical coefficient ranging from 1 to 13 prefixed to the name of this day. The beginning days of katuns, however, did not follow each other in the order that would suggest itself as natural to us, namely: 1 Ahau, 2 Ahau, 3 Ahau, and so on, but in the following order: 13 Ahau, 11 Ahau, 9 Ahau, 7 Ahau, 5 Ahau, 3 Ahau, 1 Ahau, 12 Ahau, 10 Ahau, 8 Ahau, 6 Ahau, 4 Ahau, 2 Ahau, 13 Ahau, and so on. This order, irregular as it may appear, arises quite naturally from the necessities of Maya Chronology. It follows, therefore, that any given katun could not recur until after an interval of 13 times 1 katun or its equivalent 20 tuns, or after a lapse of approximately 260 of our own years. Consequently any event stated as occurring in any given tun of any given katun fixed that event to a definite year in a period of 260 years, which was probably close enough for general purposes. No higher unit of time than the katun appears in The Books of Chilan Balam, though the Mayas of Yucatan may well have known a higher unit, since the Mayas of the Usamacinta region, an older habitat of the same culture, were familiar with a higher period composed of 20 katuns or about 400 years.

The events recorded in the five different chronicles agree fairly well with each other, as Brinton demonstrated in his "Synopsis of Maya Chronology." In some accounts, to be sure, katuns are omitted, and in others they are inserted, and in still others the same katun is repeated twice or even thrice. But when all five are studied comparatively, each acts as a check upon the other, and the context is usually such that there can be but little doubt that the Brinton sequence is, in the main, the actual arrangement of the katuns in their proper order.

According to his arrangement, 70 katuns elapsed from the earliest event recorded in the Chronicles to the Spanish Conquest, a period of nearly 1400 years.

Just after Katun 2 Ahau, in which the first appearance of the Spanish off the coast of Yucatan is mentioned, there is recorded a date in both Maya and Christian notation, apparently with extreme accuracy. This date is the death of a certain native chief called Napot Xiu, which is said to have occurred in a Katun 13 Ahau, while yet 6 tuns were lacking before the end of that katun on the day 9 Imix, which was the 18th day of the month Zip. The chronicler further states that this event took place in the Year of Our Lord 1536.

On the basis of this statement, Mr. Charles P. Bowditch assigned the date 34 A.D. to Stela 9 at Copan, although in so doing he was obliged first to make two changes in the original text. Another correlation of Maya and Christian Chronology is that made by Professor Eduard Seler on the strength of a passage in The Book of Chilan Balam of Mani. This passage states that the beginning day of Katun 5 Ahau, which was in the Year of Our Lord 1593, fell on the 15th day of the month Tzec, although a correction in the text is again necessary, before this statement can be utilized. Professor Seler's correlation gives 1255 B.C. as the date of Stela 9 at Copan, nearly 1300 years earlier than Mr. Bowditch's date for the same monument.

To accept either Mr. Bowditch's correlation or Professor Seler's, two important postulates are necessary:

(1) That the day Ahau is shifted forward from the 2d, 7th, 12th, or 17th positions in the month as found in The Books of Chilan Balam to the 3d, 8th, 13th, or 18th positions so as to agree with the inscriptions of the Usamacinta area. This shift includes a corresponding change of one place in the position in the month of all the other days; and

(2) That this change in no way disturbed the continuity of the sequence of the katuns.

The first of these postulates, it must be borne in mind, necessitates actual changes in the original texts upon which the correlations are based, and the second cannot be verified until we know the exact nature of the change which was made.

For some unknown reason the Mayas of Yucatan had gained

a day over the older cities of their culture. In the Usamacinta area, the day Ahau could be only the 3d, 8th, 13th, or 18th day of a month, and the day Imix, that on which the native chief Napot Xiu is said to have died, could be only the 4th, 9th, 14th, or 19th day of a month. Now, in The Books of Chilan Balam, where this event is recorded, the death of Napot Xiu is clearly stated to have been on a day Imix which was the 18th day of the month; and in the passage from The Book of Chilan Balam of Mani used by Professor Seler, the day Ahau is said to be the 15th day of a month, which Professor Seler would correct to the 17th. Judging from The Books of Chilan Balam, then, it would seem that the Mayas of Yucatan assigned a slightly different position to the days in the month than did the Mayas of the Usamacinta cities, Copan, Quirigua, and Palenque, for example. Or, in other words, that in the course of time a change had come about, so that the day Ahau was no longer the 3d, 8th, 13th, or 18th in the month, but the 2d, 7th, 12th, or 17th, and similarly that the day Imix had shifted from the 4th, 9th, 14th, or 19th position in the month to the 3d, 8th, 13th, or 18th. Indeed, some kind of a change or alteration in the calendar is actually recorded in two of the chronicles in these words, "Then Pop was set or counted in order," Pop being the first month of the Maya year.

There is another serious objection to these correlations, however, which must be explained before either of them can be accepted as definitive. If we substitute the Initial Series assigned by Mr. Bowditch to the year 1536, in the sequence of the katuns as given by Brinton, and count backward to the Initial Series of the Chichen Itza lintel, we find that this latter date occurred, according to Mr. Bowditch, 70 years before even the earliest mention of Chichen Itza in the Chronicles, and 170 years before the founding of the city.

Similarly, Professor Seler's Initial Series for the year 1593 gives the Initial Series of the Chichen Itza lintel a position in the sequence of the katuns over 1300 years before the first mention of that city in the Chronicles.

To explain away this very evident anachronism one of two assumptions is necessary: Either the Chichen Itza Initial Series is not a contemporaneous date, or the sequence of the katuns, as

given by Brinton, falls short of the true sequence by at least 13 katuns in the case of Mr. Bowditch's correlation, and 77 katuns in the case of Professor Seler's. The first of these assumptions is contrary to the generally accepted theory of Maya dates; and the second is contrary to the best reading of the sequence of the katuns.

There is another, though less vital, objection, since it involves no textual changes, to each of these correlations. In the passage used by Mr. Bowditch, the statement that when the chief Naput Xiu died 6 tuns were lacking before the end of the katun, is not literally true, as Mr. Bowditch himself has shown, since in reality $6\frac{5}{6}$ tuns were lacking, or nearly 7. He explains this, however, by saying the scribe who recorded the event took no cognizance of odd days, but merely counted the whole tuns needed to finish the katuns. On the other hand, the date 1255 B.C. for Stela 9 at Copan, based upon Professor Seler's correlation, is altogether too early. It makes the great cities of the Usamacinta area over 3000 years old, an antiquity that may well be doubted, if for no other reason than the remarkable preservation of delicate sculptures under the action of such a destructive vegetation as now covers the cities of this area.

Before submitting my own correlation of Maya and Christian Chronology, it is first necessary to speak of another change, or, better, abbreviation, in the Maya method of recording events, which was introduced after the period of the Usamacinta inscriptions, but before the period of The Books of Chilan Balam. The practice of naming the katuns in The Books of Chilan Balam after the days with which they began has already been explained. In the older area, however, a different method of recording dates was used; namely, the number of cycles, katuns, tuns, uinals, and kins, which had elapsed from a common normal date 4 Ahau, 8 Cumhu to the event recorded, were stated. Throughout the Usamacinta area the date 4 Ahau, 8 Cumhu was universally regarded as the starting-point of Maya Chronology corresponding to our Birth of Christ. The statement that a certain number of cycles, katuns, tuns, uinals, and kins had elapsed from this normal date to the date recorded, fixed such a date so that it could not recur, filling all the given

conditions, for many thousands of years. For example, the date of Stela 9 at Copan in Maya notation of the Usamacinta area is, 9–6–10–0–0 8 Ahau, 13 Pax, which means that 9 cycles, 6 katuns, 10 tuns, 0 uinals, and 0 kins had elapsed from the normal date 4 Ahau, 8 Cumhu to the date recorded, 8 Ahau, 13 Pax. This same date in The Books of Chilan Balam would have been recorded thus: The beginning of Tun 10 of Katun 8 Ahau, no mention being made of any particular cycle. However, as both Mr. Bowditch and Professor Seler have pointed out, there is no actual difference between these two methods, since the katuns in both instances follow each other in the same order, which is the all-important fact. This change from the Initial Series system of dating, practised in the Usamacinta area to the count by katuns found in The Books of Chilan Balam, was probably due to the fact that the latter is very much shorter and less complicated to record than the former, and fully as accurate as far as it goes; though the recurrence of a date which will satisfy given conditions is not so restricted as in the Initial Series.

For a long time it was thought that the Initial Series method of counting time had never reached the cities of Yucatan, but had collapsed in the Usamacinta area before the great northward migrations of the Maya race; and that the Mayas of Yucatan were familiar only with the abbreviated method used in The Books of Chilan Balam.

A few years ago, however, Mr. E. H. Thompson discovered at Chichen Itza, Yucatan, an inscribed lintel upon which an Initial Series was recorded. This find has never been duplicated, and the Chichen Itza Initial Series has remained, up to the present moment, the only one ever found outside of the Usamacinta area.

It would be difficult to overestimate the archaeological importance of this discovery. It is no exaggeration to say that the Chichen Itza lintel has given us the most important inscription yet recovered from the whole Maya area. This importance is due to the following fact: Chichen Itza, by the discovery of this inscription, becomes the only city mentioned in The Books of Chilan Balam to which it has been possible to assign an Initial Series date. Or, in other words, Chichen Itza is the only city in Yucatan which it has been possible to date

relatively with the older cities of the Usamacinta area. Chichen Itza, therefore, is at the present time the only connecting link between the Initial Series chronology of the Usamacinta and the later chronology of Yucatan as given by The Books of Chilan Balam.

We are now in possession of all the facts necessary to an understanding of the correlation I would propose, which depends on the following postulates:

(1) That the sequence of the katuns as determined by Brinton in his "Synopsis of Maya Chronology" is the correct one;

(2) That the year 1536 in Christian Chronology occurred sometime during Katun 13 Ahau of Maya Chronology, a postulate which is also necessary in Mr. Bowditch's correlation, as is a similar one in Professor Seler's; and

(3) That the Chichen Itza Initial Series records a contemporaneous date, a fact now generally admitted by students of Maya Chronology.

These postulates, unlike those upon which the correlations of both Mr. Bowditch and Professor Seler are based, do not ask us to take anything for granted about the positions of the days in the month, which, as we have seen, underwent some kind of a change. For this reason, the correlation which I propose lacks one great possibility for inaccuracy present in the other two. Moreover, the change recorded in the Chronicles states clearly that it has to do primarily with the months — witness the wording, "Pop was set or counted in order." That this change did not disturb the sequence of the beginning days of the katuns upon which my correlation depends would seem to be indicated by the fact that the beginning days of the katuns follow each other in the same order in the Chronicles both before and after this change without an apparent break.

The correlation I propose consists of two parts:

(1) Fixing the position of the Chichen Itza Initial Series in the sequence of the katuns as derived by Brinton from The Books of Chilan Balam;

(2) Then finding the date in Christian Chronology which corresponds to the Chichen Itza Initial Series, by using the statement in the sequence of the katuns that the year 1536 occurred in a certain Katun 13 Ahau.

After this one point of contact between the two systems has been established, it is a simple matter of substitution to find the position of any Initial Series in Christian Chronology.

The Initial Series of the Chichen Itza lintel, expressed in Maya notation, is 10–2–9–1–9 9 Muluc 7 Zac. This means that the date 9 Muluc 7 Zac occurred on Kin 9 of Uinal 1 of Tun 9 of Katun 2 of Cycle 10. Our first problem then is to find out with what day Katun 2 of Cycle 10 began, because, in the first place, this katun included the Chichen Itza Initial Series within its span, and in the second place, events in The Books of Chilan Balam are rarely recorded more exactly than as occurring within a given katun. It is found that Katun 2 of Cycle 10 began with the date 3 Ahau 3 Ceh expressed as an Initial Series by 10–2–0–0–0 3 Ahau 3 Ceh. This katun would be recorded in The Books of Chilan Balam simply as Katun 3 Ahau; that is, named after the day with which it began, and omitting the month and the period of time which had elapsed from the normal date 4 Ahau 8 Cumhu, as previously explained.

Our next problem is to find in the Brinton sequence of the katuns a Katun 3 Ahau in which there is a stated occupation of Chichen Itza. For some Katun 3 Ahau contained within its span the Chichen Itza Initial Series which we have regarded as a contemporaneous date; and consequently we ought to find in the Chronicles some Katun 3 Ahau in which Chichen Itza is said to have been occupied.

A close study of the sequence of the katuns shows that there are two katuns beginning with the day 3 Ahau in which an occupation of Chichen Itza is clearly stated, and a third during which the site may have been occupied, though the Chronicles do not record the fact. It remains for us to determine which one of these three katuns corresponds to the Initial Series 10–2–0–0–0 3 Ahau 3 Ceh.

The first of these three Katuns 3 Ahau, which we may designate as A, occurred, according to The Books of Chilan Balam, toward the close of the first period at Chichen Itza shortly before the removal to Champoton. The second, which we may call B, fell about 500 years later near the middle of the period of The Triple Alliance between the cities of Chichen Itza, Uxmal, and Mayapan. The third, C, during which Chichen

Itza probably was occupied, though there is no direct statement to that effect in the Chronicles, occurred about 260 years later, some time before the final destruction of Mayapan. It was during this final period, at Chichen Itza probably, that the strong Nahuatl influence so noticeable in the sculptures of this site was felt. This influence may have been due to the fact that Chichen Itza was conquered about this period by the ruler of Mayapan with the help of Nahuatl mercenaries, to whom the city may have been given as a reward for their share in the conquest.

That A was the only possible one of these three Katuns 3 Ahau which could correspond to the Initial Series 10–2–0–0–0 3 Ahau 3 Ceh is proved by several different lines of evidence :

(1) If we assign the Initial Series 10–2–0–0–0 3 Ahau 3 Ceh to either B or C, we reach, in the case of B, an Initial Series 8–8–0–0–0 6 Ahau 13 Mac for the discovery of Chichen Itza as given by The Books of Chilan Balam, and in the case of C, an Initial Series 7–15–0–0–0 6 Ahau 13 Tzec, for this event. To any one at all familiar with Maya Chronology, such Initial Series as these are impossible as designating contemporaneous events. The earliest contemporaneous date at Copan, the oldest site of the Maya culture now known, is 370 years later than the Initial Series given by B, and 630 years later than the Initial Series given by C.

(2) The use of 10–2–0–0–0 3 Ahau 3 Ceh, as the Initial Series value of A, gives 9–0–0–0–0 8 Ahau 13 Ceh as the Initial Series of the earliest event recorded in The Books of Chilan Balam. This Initial Series, which denotes the beginning day of Cycle 9, must have been of peculiar significance to the Mayas, since every one of their dates which it is possible to regard as contemporaneous, with the exception of a few at the beginning of Cycle 10, all fall within Cycle 9. This cycle saw the rise and fall of all the great cities of the Usamacinta area. A thousand years later, when The Books of Chilan Balam were written, the beginning of the cycle in which occurred their Golden Age must have had a peculiar importance to the Mayas of Yucatan, and must have seemed to them an extremely appropriate date from which to start their chronicles. That the land of Nonoual, from which they claim to have come, may have been

mythological, as Dr. Brinton has shown, strengthens our identification of 10–2–0–0–0 3 Ahau 3 Ceh as the Initial Series corresponding to A. In the departure from Nonoual in 9–0–0–0–0 8 Ahau 13 Ceh, which this Initial Series value for A gives, we have not the record of an actual historical event, but of a mythological event. The land of Nonoual may well be a mythological place agreed upon, perhaps by the priesthood, at a much later time as the original home of the Maya race, and the beginning of Cycle 9 must have seemed to them a very appropriate date for that migration to have started. The use of either B or C as corresponding to 10–2–0–0–0 3 Ahau 3 Ceh, on the other hand, again gives impossible Initial Series for the opening event in The Books of Chilan Balam from the Maya point of view.

It is very significant that the use of A gives such an important round number in Maya Chronology as the beginning of Cycle 9 as the date of the earliest event recorded in the Chronicles, *i.e.* the departure from the former home of the race.

(3) A third reason for choosing A as corresponding to 10–2–0–0–0 3 Ahau 3 Ceh is that, if we do so, a very natural historical cause for the decay of the Initial Series system of reckoning time developes. In 10–3–0–0–0 1 Ahau 3 Yaxkin, about ten years after the Initial Series of the Chichen Itza lintel, the Mayas abandoned that site according to The Books of Chilan Balam, and removed to Champoton, on the west coast of Yucatan, near Campeache. Including the forty years' wanderings in the wilderness before reaching Champoton, and another forty years after the abandonment of Champoton, in all 360 years elapsed before the Mayas returned, and occupied Chichen Itza a second time. During this long exodus, a great part of which was spent in wandering without fixed homes, the knowledge, or at any rate the general use, of the Initial Series may have been forgotten. The use of either B or C, on the other hand, developes no long gap, like the removal to Champoton, in the sequence of the katuns to account for the discontinuance of the Initial Series.

(4) A fourth reason for using A as corresponding to 10–2–0–0–0 3 Ahau 3 Ceh is, that if we omit the part dealing with the month in the passage from The Book of Chilan Balam

of Mani used by Professor Seler in his correlation, the correlation I propose receives satisfactory corroboration from this source. My correlation assigns to Stela 9 at Copan a date between the years 284 and 304 A.D., depending upon what tun of Katun 13 Ahau coincided with the year 1536. Using the passage in The Book of Chilan Balam of Mani, amended as I propose, which states that the first tun of Katun 5 Ahau occurred in 1593, a date 282 A.D. is reached for Stela 9 at Copan. This date 282 A.D. is within 2 years and 22 years respectively of the two limits 284 and 304 A.D. reached by my correlation for this monument. Moreover, if we care to assume that the date of Naput Xiu's death was 9 Imix 19 Tzec instead of the 9 Imix 18 Tzec actually recorded, as Mr. Bowditch was obliged to do in order to reach his correlation, my date for Stela 9 at Copan becomes 294 A.D., or within 12 years of the date for this monument reached by a different process based upon a different passage in the Chronicles.

A comparative idea of the three correlations presented in the foregoing discussion is best gathered by a review of the dates in Christian Chronology which they assign to the same Initial Series, — Stela 9 at Copan, for example. Professor Seler's date of 1255 B.C. for this is by far the oldest; Mr. Bowditch's date, 34 A.D., comes next. My own correlation assigns a date to this monument somewhere between the years 284 to 304 A.D., which an assumption made by both Mr. Bowditch and Professor Seler in their correlations would narrow to 294 A.D. Finally, the passage from The Book of Chilan Balam of Mani, as I have amended it, gives the date of this monument as 282 A.D.

I suggest, in conclusion, that in view of the evidence presented, the correlation which I have proposed is less open to error than either of the other two for the following reasons:

(1) It involves no textual changes in the original sources as do the other two;

(2) It developes no anachronism as do the other two; and

(3) It presumes less in its postulates than do the other two.

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L'ORIGINE DE LA LÉGENDE D'HUITZILOPOCHTLI

PARIS

AU SECRÉTARIAT DE L'ASSOCIATION

28, RUE SERPENTE, 28

(Hôtel des Sociétés savantes)

M. le Comte de CHARENCEY

A Paris.

L'ORIGINE DE LA LÉGENDE D'HUITZILOPOCHTLI

[398.2 (72)]

— *Séance du 12 août 1897* —

Voici, d'après la tradition mexicaine, de quelle façon naquit le Dieu que l'on peut considérer comme le Mars de la Nouvelle-Espagne.

Sur un mont appelé *Coatépec*, litt. « A la Montagne du Serpent », non loin de la célèbre cité de Tulan en Xocotitlan, ancienne métropole de l'empire Toltèque, vivait une femme appelée *Coatlicuyé*, litt. « Jupon de serpent ». Elle était mère d'un grand nombre de fils connus sous le nom de *Centzon Vitznahuas*, litt. « Quatre cents méridionaux, quatre cents *Nahoas* du Sud » et avait pour sœur *Coyolxauhqui*, litt. « Grande dame parée à la mode antique ».

Chaque jour, par esprit de pénitence, Coatlicuyé balayait le pavé d'un temple du voisinage. Pendant qu'elle était occupée de la sorte, une petite boule de plumes, semblable à une pelote de fil, tomba sur elle. L'ayant saisie, elle la cacha sous sa jupe. Après avoir fini sa tâche, elle voulut la reprendre, mais la pelote avait disparu et Coatlicuyé se trouva enceinte. En apprenant cette nouvelle, les *Centzon Vitznahuas* entrèrent en fureur et Coyolxauhqui leur conseilla de tuer leur mère, parce qu'elle les avait couverts de déshonneur.

L'enfant que Coatlicuyé portait dans son sein la rassura et calma son effroi en lui disant : « N'aie point peur, je sais ce que j'ai à faire. » Aussitôt, sa mère sentit le calme renaître dans son âme. Décidés à mettre celle-ci à mort, les Centzon Vitznahuas commencent à arranger leurs cheveux en torsades, comme des guerriers marchant au combat. L'un d'entre eux appelé *Quauhitlicac*, qui n'approuvait pas leur dessein, alla prévenir Huitzilopochtli, lequel n'était pas encore né. Ce dernier répondit : « O mon oncle, regarde soigneusement ce qu'ils font, écoute ce qu'ils disent, parce que je sais, de mon côté, comment je dois agir. »

Cependant, les meurtriers apparaissent bien armés et le corps couvert de morceaux de papier. Coyolxauhqui leur servait de guide. Quauhitlicac court avertir Huitzilopochtli : « Où sont-ils en ce moment? » demande celui-ci. « Ils arrivent à *Tzompantitlan* », litt. « Près du puits patibulaire » répliqua le messager.

Peu après, Huitzilopochtli reprend : « Et actuellement, où est-ce qu'ils se trouvent? » « A *Coaxcalco* », litt. « A la maison du serpent » dit Quauhitlicac. Huitzilopochtli demande une fois encore « En quel endroit sont-ils parvenus ? » La réponse fut qu'ils approchaient de Petlac. A une autre question du neveu de Quauhitlicac, il est répondu « Les voici tout près et Coyolxauhqui marche à leur tête. » Au même instant, le Mars mexicain sort tout armé du sein maternel. Il portait une rondache bleue appelée *Téneuch*, avec un dard teint de la même couleur. Sa figure était peinte et sa tête surmontée d'un ornement, lequel s'y trouvait collé. Sa jambe gauche était frêle et couverte de plumes, les cuisses et les bras également peints en bleu. Le dieu ordonne à un nommé *Tochan Calqui*, litt. « habitant de notre demeure » de mettre le feu à un serpent fabriqué en bois de pin et appelé *Xiuhcoatl*, litt. « serpent d'herbe » et sans doute métaphoriquement « serpent enflammé ». Rappelons-nous en effet le titre de *Xiuhteuctli*, litt. « Seigneur de l'herbe » donné au dieu du feu, au Vulcain de la Mythologie mexicaine.

Quoi qu'il en soit, la sœur de Coatlicuyé fut frappée à mort avec ce bois. Puis Huitzilopochtli poursuivit tout armé les Centzon Vitznahuas de la sierra jusqu'à la plaine. Il fait ainsi quatre fois le tour de la montagne, sans que ses frères puissent se défendre contre lui. Malgré leurs pleurs et leurs supplications, la belliqueuse divinité les mit presque tous à mort. Quelques-uns cependant parviennent à gagner le pays de *Huitzlampa*, litt. « vers le phumb du Sud ». Le vainqueur s'empare des dépouilles des fugitifs et spécialement de leurs armes appelées *Anécuhiotl* (1).

Visiblement, cette légende résulte de la fusion d'éléments fort divers combinés ensemble et qui peuvent encore, en partie du moins, être détachés les uns des autres et ramenés à leur source primitive.

Reconnaissons-y, d'abord, une réminiscence d'événements historiques, mais dont la légende est venue plus tard prodigieusement modifier le caractère primitif. *Huitzilopochtli*, le Mars du Mexique et dont on traduit d'ordinaire le nom par « Colibri gaucher » personnifie,

(1) SAHAGUN, *Histoire générale des choses de la Nouvelle-Espagne*, traduction de MM. le Dr Jourdan et Rémi Siméon ; liv. III ; chap. 1er ; p. 201 et suiv. (Paris 1880). — TORQUEMADA *Monarquia indiana* ; t. II ; livre VI ; chap. XXI ; pages 41 et 42 (Madrid 1723).

sans aucun doute, la migration des Mexicas quittant les provinces de Jalisco et de Méchoacan pour se rendre sur le plateau d'Anahuac, de même que *Melkarth*, l'Hercule Tyrien, personnifiait les navigation et colonisation des Phéniciens sur tout le pourtour de la Méditerranée. Voilà pourquoi on nous le représente venant au monde, tout près de la fameuse cité de Tulan en Xocotitlan. Métropole légendaire du vieil empire Toltèque, elle fut certainement le siège d'un Etat, relativement assez puissant et fondé par les Mexicas avant leur arrivée à Ténochtitlan. La victoire du dieu sur Coyolxauhqui et les Centzon Vitznahuas symbolise le triomphe des émigrants sur les anciens habitants de la région et qui peut-être bien appartenaient eux aussi à la race Nahuatle. Ils auraient éprouvé une fortune pareille à celle par exemple des Hérules que vainquirent les Goths, lesquels pourtant leur étaient étroitement apparentés par le sang aussi bien que par la langue.

En tout cas, cette arrivée des Mexicas à Tulan nous reporterait vers le XI ou XII[e] siècle de notre ère. Le fond de la légende mérite à coup sûr de passer pour beaucoup plus ancien. Il se sera, pour ainsi dire, greffé, à une époque relativement fort récente, sur cet événement historique.

Une autre portion du récit mexicain a certainement été inspirée par les traditions relatives à un héros charmant, civilisateur et bienfaisant, né d'une vierge, et qui paraît remonter bien haut dans la série des âges. Peut-être serait-ce en Asie-Mineure qu'il conviendrait d'en chercher le prototype. Rappellerons-nous à ce propos l'aventure de Nana ou Sangaride, fille de Sangarus, roi de Phrygie? Elle devint enceinte d'Atys rien que pour avoir recueilli dans son sein le fruit d'un amandier (1).

En tout cas cette légende ne tarda pas à se répandre au loin et nous en retrouvons d'innombrables versions sur quantité de points tant de l'Ancien que du Nouveau-Monde.

Sans doute, Coatlicuyé ne nous est nulle part donné comme vierge. Le fait même qu'elle avait donné le jour à quatre cents garçons nous autorise, ce semble, à croire tout le contraire. Il n'en est pas moins vrai que la façon dont elle donne le jour à Huitzilopochtli rappelle absolument l'histoire de Sangaride.

A notre avis, le fond même de la légende du Mars mexicain se rattache à une autre source. Nous y voyons simplement une version d'antiques récits en vigueur chez les races de l'Extrême-Orient, relatifs à un héros libérateur, né d'une façon merveilleuse, qui parle

(1) Arnobe *Contra gentes*, liv. VIII. — *Le Folklore dans les Deux-Mondes*, p. 121 et suiv. du t. XXIII des *Actes de la Société Philologique* (Paris 1894).

avant sa naissance et délivre son peuple de l'oppression ; ils furent transportés comme tant d'autres sur la rive opposée du Pacifique, à une époque que nous n'entreprendrons pas ici de préciser.

Ainsi qu'il arrive souvent, le récit américain semble avoir par certains points conservé un caractère plus archaïque que les récits asiatiques auxquels il se trouve apparenté. Le fait s'explique sans trop de difficulté. C'est que l'Amérique ancienne n'eut point à souffrir de ces révolutions politiques et religieuses telles que la conquête d'Alexandre ou l'éclosion du Bouddhisme et dont l'influence se fit sentir jusque dans le domaine du Folklore. Est-ce que l'Europe moderne ne nous offre pas l'exemple d'un phénomène tout semblable ? Les contes et chants populaires des Lithuaniens, par exemple, n'ont-ils pas conservé un cachet beaucoup plus primitif que ceux des Serbes et des Croates ? C'est que les populations des rives de la Baltique ont mené longtemps une existence isolée et joui d'une paix au moins relative. Au contraire, chez les habitants de la péninsule Balkanique, la lutte contre l'Islamisme fit promptement tomber en oubli le souvenir des temps antiques.

Quoi qu'il en soit, la version que nous trouvons aujourd'hui en vigueur dans l'Annam a bien conservé son ancien caractère militaire. Elle nous rapporte que sous le règne de l'avant-dernier monarque de la dynastie des Hung, c'est-à-dire vers le début du quatrième ou la fin du troisième siècle avant notre ère, une armée chinoise envahit le pays. A la suite d'une grande défaite subie par son général *Ly-công-dât*, le souverain annamite découragé ne savait plus qui opposer à l'ennemi.

Heureusement, vivait à cette époque dans le village de Phu-dông, un homme âgé de plus de 60 ans et dont la femme avait conçu d'une manière miraculeuse. Près de quatre ans auparavant, traversant le village de *Bin-tou* (aujourd'hui *Ti-cou* près de *Bac-ninh*), elle avait remarqué, sur la terre, l'empreinte d'un pied de grandeur extraordinaire : ayant elle-même marché sur cette empreinte, cette femme se trouva aussitôt enceinte.

L'enfant dont elle accoucha n'avait jamais parlé depuis le jour de sa naissance et se tenait toujours étendu sur le dos, sans pouvoir remuer ni s'asseoir. Cependant un héraut était venu dans le village de Phu-dông, pour appeler, de la part du roi, tous les hommes valides sous les drapeaux, leur promettant de grandes récompenses. La mère du jeune enfant l'ayant entendu s'écria : « Malheur à moi qui « ai enfanté un être inutile, ne sachant que boire et manger! Ce n'est « pas lui qui sera jamais capable de se mesurer avec les ennemis

« du royaume ; le roi peut réserver pour d'autres ses bienfaits. Nous « nous contentons de téter et de nous gaver de bouillie. »

A peine l'enfant eut-il entendu sa mère s'exprimer de la sorte qu'il se leva sur son séant et dit : « Je vous prie de faire venir ici le héraut ». La mère, devant ce prodige, fut saisie d'une grande frayeur. Elle appela sa voisine qui, à son tour, resta stupéfaite et conseilla de faire entrer l'envoyé du roi.

Dès qu'il l'aperçut, l'enfant se leva tout debout s'écriant : « Retourne dire au roi qu'il fasse forger un cheval de fer, haut de « huit pieds, une massue et un casque de fer. L'enfant qui te parle « montera sur le cheval et se coiffera du casque, s'armera de la « massue et dissipera les ennemis. ».

« — De quel poids voulez-vous la massue ? demanda le héraut. »
« — De cent livres, reprit l'enfant, et le cheval de mille livres. »

Le héraut s'empressa de retourner vers le roi à qui il rendit compte de ces faits extraordinaires. « Le ciel, s'écria le monarque, manifeste son intention de nous sauver. » Il commande à son surintendant de faire fabriquer le cheval, la massue, l'armure, et d'adresser le tout à l'enfant. Ce dernier fut d'abord mécontent, parce que le cheval de fer n'avait pas d'entrailles et il exigea qu'on lui en forgeât. On fit ce qu'il désirait. On introduisit des entrailles de fer dans le ventre du coursier et le tout fut porté au village de Phu-dông.

Quand la mère vit arriver tous ces objets, elle eut peur pour son fils et le lui dit. Celui-ci reprit en riant : « Ne prenez pour « l'instant d'autre souci que de me faire préparer à manger et à « boire. Je dois prendre beaucoup de forces pour commencer la « campagne. »

Sitôt que l'enfant eut commencé à manger, il grandit d'une façon extraordinaire. Sa mère ne parvenant pas à le rassasier, on dut avoir recours aux voisins. Tout le village apporta du riz et du vin pour ce repas extraordinaire qui dura deux jours. Après quoi, l'enfant devenu un géant, revêtit l'armure, monta le cheval de fer et se mit en marche.

Le roi avait ordonné à son neuvième fils, appelé *Uy-son*, de l'accompagner. L'armée annamite formait trois corps de troupes, chacun de trente mille hommes. Le guerrier miraculeux était en tête et son cheval de fer fendait l'espace comme s'il avait eu des ailes. Tout le monde était enthousiasmé de ce prodige et les volontaires accouraient de tous côtés. On vit deux frères de la famille *Nguyen*, du hameau de *Nghiem-xa*, abandonner leurs buffles dans la rizière et, armés du fer de leurs charrues, suivre les soldats.

On atteignit l'ennemi à la montagne de *Trau* (entre *Bac-ninh* et *Dap-cau*) où les avant-postes étaient fortement retranchés et le combat s'engagea immédiatement. Après un choc terrible, mais décisif, quatre généraux Chinois restent étendus morts sur le terrain. Leurs soldats mis en fuite sont poursuivis jusqu'à une assez grande distance. Au fort de la mêlée, le guerrier miraculeux ayant brisé sa massue de fer, arracha une touffe de bambou et s'en servit pour achever la déroute des ennemis. Ceux d'entre les Chinois qui ne succombèrent pas, affolés par la peur, rendirent leurs armes. Vingt-quatre des principaux officiers s'étant engagés à ne plus servir contre le *Vun-lang* (c'était le nom qu'on donnait alors à l'empire d'Annam), furent remis en liberté.

Le fils de l'empereur de Chine, trouvé parmi les morts, fut inhumé au pied de la montagne. On y montre encore son tombeau.

Après la victoire, le guerrier miraculeux, remontant sur son cheval de fer, prit la route de *Kim-anh* et la suivit jusqu'à la montagne de *Vu-linh*. Arrivé là, il jeta la touffe de bambou dont il s'était servi pendant le combat, quitta ses vêtements de fer, gravit la montagne, puis s'envola au ciel. Le cheval de fer se rendit tout seul au village de *Dong-ci*.

Aujourd'hui encore on trouve, sur le sommet de la montagne, la marque d'un pied imprimé sur la pierre. C'est l'empreinte que laissa le guerrier en quittant la terre. A l'endroit où le cheval s'arrêta, on construisit un temple qui fut doté par le roi d'un domaine de dix *mâns* de rizières. Un autre temple fut également élevé dans le village où était né le libérateur de l'Annam et l'on érigea, sur l'emplacement de sa maison, une statue de pierre portant ces mots en chinois : « Ici, autrefois, était la demeure du céleste *Dong*. » Le monarque annamite affecta le revenu de cent *mâns* de rizières à l'entretien de ces deux monuments.

Enfin, non loin de quinze cents ans plus tard, vers 1020, le roi *Ly* qui était originaire des environs, voulut honorer, lui aussi, le grand génie national. Il lui éleva deux temples, l'un dans son village natal de Phu-dông, auprès de la maison commune, l'autre sur le versant de la montagne *Vu-ninh* ou *Vê-linh*, près le *Phu* de *Tu-son*. Dans ce dernier, on plaça la statue du héros qui s'y trouve encore.

En commémoration de leur délivrance, les Annamites célèbrent chaque année, dans les temples du génie en question, et spécialement dans celui de Phu-dông, des fêtes auxquelles on donne le plus d'éclat possible. Au cours de ces solennités, on rappelle par des groupes historiques le grand événement qui s'est accompli il y a vingt-trois

siècles. La crête de la toiture du temple où elles se célèbrent est ornée de dragons en porcelaine bleue.

Des députations de tous les villages du canton viennent faire des offrandes au génie. Elles sont composées de notables, tous correctement vêtus de la robe bleue à longues manches. La cérémonie se termine par un simulacre de combat rappelant celui dans lequel le héros annamite avait vaincu les guerriers du Céleste Empire. Les généraux chinois apparaissent, dit-on, figurés par de jeunes vierges, lesquelles d'ailleurs jouent un rôle muet et doivent garder l'immobilité la plus absolue (1).

Cette intéressante légende a subi tant de remaniements que sa physionomie primitive s'en est trouvée tout altérée et que sans l'existence d'autres versions du même récit, sa parenté avec l'histoire de Huitzilopochtli resterait douteuse.

Effectivement, dans tout ce qu'on nous raconte au sujet des exploits du héros annamite, il y a sans doute un fonds de vérité historique sur laquelle s'est greffée la légende, ce qui démontre à quelle haute antiquité il convient de la reporter. En tout cas, le fait d'une victoire remportée vers la fin du III^e^ siècle av. J.-C par les guerriers du *Vanlung* sur la Chine ne paraît guère contestable. Seulement on s'est empressé d'en environner le souvenir de détails merveilleux. De là, les différences si prononcées avec le récit mexicain. Moins avancés en civilisation, moins gênés par les réminiscences de l'histoire réelle, les peuples de la Nouvelle-Espagne ont conservé la légende antique relativement pure d'éléments adventices. Ainsi, c'est Huitzilopochtli seul qui a triomphé des Vitznahuas. Au contraire, les peuples d'Annam ne pouvant perdre le souvenir d'une grande bataille livrée, font simplement, du génie *Dong*, une manière de général en chef qui ne dédaigne pas de se faire aider dans son œuvre de libération par une nombreuse armée. Enfin, si le Mars mexicain commence à parler avant d'avoir quitté le sein maternel, le narrateur asiatique a cru, sans doute, rehausser le mérite de son héros et donner une couleur plus dramatique au récit en ne laissant *Dong* prendre la parole qu'au moment de combattre pour son pays.

Le trait de la conception du guerrier de l'Annam, tenant à ce que la mère avait posé le pied dans l'empreinte laissée par un génie, semble emprunté au Folk-lore du Céleste Empire. On le retrouve par exemple dans les légendes de *Hoa-sin*, la mère de l'empereur

(1) M. G. Dumoutier, *Une fête religieuse annamite au village de Phu-dông* (Tonkin), p. 67 et suiv. du t. XXVIII de la *Revue de l'histoire des religions*, n° de juillet-août 1893.

Fo-hi (1) et de *Kiang-Youen*, laquelle donna le jour à *Héou-Hi*, le fondateur de la dynastie des *Tséou* (2).

Par exemple, un point de contact à signaler entre les deux récits et qui pourrait bien n'être pas dû au seul hasard, c'est le rôle vraisemblablement symbolique affecté à la couleur bleue. Huitzilopochtli, on vient de le voir, avait les cuisses et les bras peints en bleu. La même teinte reparaissait sur son bouclier et son javelot. De même, la crête de la toiture du temple où se célèbre la commémoration de la victoire de Dong, est ornée de dragons peints en bleu. Les notables assistant à la cérémonie sont vêtus de blouses de cette nuance. Serait-ce même à cause de la teinte bleue du fer que le cheval et la massue du héros sont fabriqués en ce métal ?

Nous verrons tout à l'heure quelle interprétation l'on pourrait être tenté de donner d'une telle coïncidence.

Notre légende reparaît dans l'Inde et l'on ne saurait dire depuis quelle époque elle a commencé à y être connue. En tout cas, si le récit des riverains du Gange a fortement subi l'influence des idées brahmaniques, on ne saurait nier qu'il n'ait conservé bon nombre de traits primitifs subsistant aussi à la vérité dans la version mexicaine, mais qui font défaut dans celle de l'Annam. Le rôle assigné à *Aurva* est, nous le verrons à l'instant, tout à fait celui que joua *Huitzilopochtli*. Voici, du reste, ce que nous lisons dans le *Mahabhârata*, poème dont la rédaction définitive n'est sans doute pas antérieure aux premiers siècles de notre ère.

Un jour, l'épouse du pénitent *Vacishtha* voulant détourner Paraçara, le petit-fils de son mari, des idées de vengeance qu'il avait conçues, lui fit le récit suivant :

Des *Kschattriyas* ou guerriers de la race de *Kritavîrya* résolurent d'exterminer les *Bhrigus*, ascètes illustres par leurs vertus et qui appartenaient à la souche des *Rishis*. Malgré tous les soins qu'ils prirent pour échapper à la rage de leurs ennemis, presque tous ces saints personnages furent mis à mort ainsi que leurs épouses. L'une de celles-ci voyant les guerriers impitoyables ouvrir le ventre de ses compagnes pour en arracher le fruit, s'empresse de recourir au procédé jadis employé par Jupiter pour Bacchus, le fils de Sémelé, c'est-à-dire qu'elle cacha son nouveau-né dans sa cuisse. Il se pourrait même que ce trait ait été emprunté à la mythologie greco-romaine, mais c'est le seul de toute la légende qui semble dans ce cas. Quoi qu'il

(1) Lord MACARTNEY, *Voyage dans l'intérieur de la Chine*, trad. de Castéra, t. Ier, p. 48.

(2) R. P. PRÉMARE, *Traditions primitives*, etc., § 4, p. 488 et suiv. du Cahier de déc. 1875 des *Annales de philosophie chrétienne*.

en soit, les égorgeurs ayant été prévenus de tout ceci par un misérable qui tentait de sauver sa vie au moyen d'une délation, vinrent pour tuer la mère avec son fils. Celui-ci sortant alors de la cuisse maternelle, parut soudain environné d'une telle lumière, qu'à l'instant les guerriers eurent les yeux brûlés. Ils conjurèrent alors le jeune héros d'avoir pitié d'eux. L'enfant de la Bhrigu s'étant enfin laissé fléchir, leur rendit la vue. Il reçut ensuite le nom d'*Aurva* (né de la cuisse) qui rappelle sa naissance miraculeuse, puis se signale par toutes sortes d'exploits (1).

Evidemment, dans la version primitive, l'enfant merveilleux ne montrait pas tant de clémence et, comme le Mars mexicain, mettait à mort, tout au moins, bon nombre de ses ennemis.

Ajoutons que cette faculté de parler avant sa naissance semble avoir constitué une sorte d'apanage des membres de la famille de Vacishtha. Un autre passage du Mahabhârata parle de certain ascète appartenant à la race en question et qui avait perdu son fils *Çaktri*. Désespérant de jamais avoir désormais une postérité, il résolut de mettre fin à ses jours, mais après plusieurs essais infructueux de suicide, s'écria enfin : « Hélas, je ne puis mourir ! »

Un jour cependant que l'ascète errait par monts et par vaux, il ne s'aperçut pas que sa belle-fille le suivait. Comme elle marchait près de lui, voici qu'il entend soudain une voix qui récitait distinctement les Védas, sans oublier les dix *angas*. L'ascète se retourne et demande : « Qui donc me suit ? » Sa bru lui répondit : « Je suis *Adricyanti*, la veuve de *Çaktri* ; bien que vouée à l'ascétisme, je suis désespérée. » Vacishtha reprit : « O ma fille, quelle est donc la voix que j'entendais tout à l'heure, réciter les Védas, avec les *angas* et qui ressemble si fort à celle de mon fils *Çaktri* ? »

Adricyanti lui répondit : « Je porte dans mon sein le fils de *Çaktri*. Voici douze ans passés que je l'ai conçu. La voix que vous venez d'entendre est celle de cet « embryon » ascète qui récitait les Védas. »

A ces mots, le vieux pénitent s'écria plein de joie : « J'ai encore un fils. » Il ne chercha plus à mettre fin à ses jours et accompagné d'Adricyanti, reprit le chemin de sa demeure.

Celle-ci donna enfin le jour à un enfant mâle dont l'esprit était, depuis bien longtemps déjà, illuminé par la science védique (2)

Cette nouvelle version de la vieille légende du héros libérateur mérite bien de nous arrêter un instant, ne fût-ce qu'en raison des

(1) *Mahabhârata, Adi-Parvan, Adhayaya*, CLXXVII. — A. Roussel, *Les idées religieuses du Mahabhârata*, p. 266 et 267 du *Muséon*, t. XII, n° 3 (Louvain 1893).

(2) Ibid. *Muséon*, p. 265.

profondes modifications qu'elle a subies et parce qu'elle pourrait bien avoir donné naissance à la version japonaise dont il va être parlé tout à l'heure. Il n'est plus question ici de guerrier ni de combats. Le caractère sacré et hiératique du personnage principal s'accentue ici de plus en plus. La seule donnée primitive qui paraisse fidèlement conservée, c'est celle du don à lui concédé de parler avant sa naissance. Il est vrai qu'un élement sans doute étranger s'est venu, peut-être à une époque très postérieure, ajouter au récit originel, c'est celui de la longue gestation de Çaktri. Y aurait-il ici trace d'influence chinoise ? C'est ce que nous n'oserions affirmer, mais ce qui reste toutefois fort possible. Que sont, en définitive, les douze ans passés par Çaktri dans le sein maternel, auprès des quatre-vingt-une années pendant lesquelles la mère de *Lao-tsen* reste enceinte de ce philosophe? (1) Il est vrai que ce dernier est regardé par certains auteurs comme étranger à la Chine et venu en ce pays, de Birmanie (2). Dans cette hypothèse, les récits concernant ces gestations prolongées mériteraient d'être considérés comme d'origine indo-chinoise. C'est là, du reste, une question que nous n'avons pas à examiner ici. Rappelons seulement que les Maures de la Tunisie se figuraient que l'embryon, une fois conçu, peut rester un temps plus ou moins long endormi dans le sein maternel et l'on aurait vu, dit-on, des enfants continuer leur sommeil pendant plusieurs années, sans que cette façon d'agir de leur part, causât le moindre préjudice à l'honneur de la mère (3). Une telle manière de voir a visiblement été propagée par des épouses qui se trouvaient dans une situation plus délicate qu'intéressante ou menacées de divorce, à cause de leur stérilité prolongée.

Il n'y aurait donc rien d'étonnant à ce qu'elle ait pris naissance sur plusieurs points à la fois. Elle ne dut point, en tout cas, manquer de se répandre bien vite au loin.

Le récit japonais peut passer pour une répétition légèrement altérée de celui que nous venons d'étudier en dernier lieu. Toutefois l'embryon de sang brahmanique se trouve naturellement remplacé par un moine de la secte de Cakya-Mouni. Voici ce que les insulaires de Niphon nous rapportent du religieux appelé *Sotoktaïs*, lequel vivait dans le courant du VI[e] siècle de notre ère. Il eut pour mère

(1) C. Pauthier, *Chine*, 1re partie, p. 112 (Paris 1837), de la collection l'*Univers*, publiée par Firmin Didot.

(2) Terrien de la Couperie, *Origin of the early chinese civilisation*, etc., p. 52 et 53 du n° 3, 8e vol. du *Babylonian and oriental report* (septembre 1892).

(3) *Algérie, Etats Tripolitains, Tunis* par le Dr L. Franck, p. 109 (Paris 1850) de la Collect. *L'Univers* par Firmin Didot. *La régence de Tunis*, p. 311, du t. 1er de la *Revue Orientale* et *Américaine* (Paris, 1859).

une vierge et se mit à parler avant même que de naître dans le 8e mois qui suivit sa conception. Des reliques de Bouddha lui arrivèrent d'une façon miraculeuse, alors qu'il n'était encore âgé que de quatre ans (1). Plus tard Sotoktaïs devint l'une des gloires de l'Eglise Bouddhique au Japon.

En tenant compte des causes de modification qui se sont nécessairement produites en plus d'un endroit et à plus d'une reprise, on voit que tous les récits ici étudiés peuvent facilement se ramener à un prototype commun. Les traits originaux semblent s'en être conservés surtout dans la légende mexicaine. Ne concluons pas de là que cette dernière mérite de passer pour la plus ancienne, que notre conte a dû prendre naissance au sein des tribus de la Nouvelle-Espagne pour se répandre ensuite jusqu'au cœur du continent Asiatique. Nous avons déjà tenté de déterminer le motif pour lequel tant de récits populaires communs aux deux continents ont gardé une physionomie plus archaïque chez les peuples de la race cuivrée. A notre avis, c'est bien en Asie qu'il convient de chercher le berceau de la légende en question, laquelle aura, par la suite, été transportée de l'autre côté du Pacifique.

Et qu'on ne nous objecte pas l'identité de l'esprit humain sous n'importe quelle latitude. Il a parfaitement pu, nous dira-t-on, imaginer des récits similaires en des lieux très différents et sans qu'on puisse logiquement conclure de là à un emprunt. Nous sommes les premiers à reconnaître tout le danger qu'il y aurait à se montrer trop facile à admettre l'unité d'origine de chaque conte. Mais n'oublions pas, d'autre part, qu'ici nous nous trouvons en face d'une légende offrant un caractère tout spécial et parfaitement déterminé. Elle se rapporte aux origines mêmes sinon de la race, du moins de l'état des *Mexicas*.

Nous nous sommes occupé précédemment de deux autres mythes américains offrant eux aussi une importance particulière au point de vue historique et ethnologique, ceux du Tzendale Votan et de Quetzalcohuatl, pris comme personnification de l'empire Toltèque. Précisément, ils possèdent un point de commun avec celui que nous étudions en ce moment, c'est de rappeler, de la façon la plus étroite, certains mythes propres à l'Asie. On ne saurait se refuser à voir dans la légende de Votan, une réminiscence de celle des princes civilisateurs de l'Indo-Chine, du Siamois *Phra-Ruang* et du Birman *Pyu-tsauti* (2). Quant à Quetzalcohuatl, les principaux traits de sa

(1) KAEMPFER, *Histoire du Japon*, trad. de Scheuchzer ; t. Ier, liv. II, chap. IV ; p. 263 et 264 (Amsterdam 1732).

(2) *Le mythe de Votan*, p. 61 et suiv. du t. II des *Actes de la Société philologique* Alençon 1671).

physionomie se retrouvent incontestablement dans l'Iranien Djemschid (1). Des coïncidences si répétées, portant sur une classe aussi restreinte de mythes populaires ne nous semblent guère attribuables au seul hasard. Rappelons qu'elles paraissent également se manifester en ce qui concerne d'une part le calendrier (2) et le zodiaque (3) des peuples du Pérou et de la Nouvelle-Espagne et de l'autre ceux des races de l'Extrême-Orient. Il n'y a donc plus, ce semble, à hésiter. La conclusion toute naturelle à tirer de ces faits, c'est qu'ils constituent, pour ainsi dire, autant de réminiscences d'antiques relations ayant jadis existé entre les deux mondes. C'est un puissant argument à invoquer pour ceux qui regardent les premiers germes de la civilisation dans le Nouveau-Monde comme importés d'Asie.

Quelle que soit l'opinion, d'ailleurs, que l'on professe sur ce point, reste à se demander comment le mythe ici étudié a pu prendre naissance. Évidemment, malgré son allure quelque peu digne de l'épopée, nous ne saurions lui reconnaître une valeur plus historique qu'aux contes du Chat botté ou de la Belle au Bois dormant. D'autre part, y voir purement et simplement le fruit de l'imagination de quelque conteur nous semblerait peu conforme aux données générales de la psychologie.

L'esprit du peuple ne procède pas de la sorte. Il ne travaille que sur un fond préexistant, sur une donnée fournie soit par la tradition, soit par la nature elle-même. Puisque l'on ne peut guère, et pour une foule de raisons inutiles à développer ici, expliquer notre mythe par l'histoire, force sera bien de rechercher une autre explication. Malgré les protestations souvent justifiées de ceux qui reprochent à M. Max Mueller de s'être montré un peu trop absolu dans l'emploi de la méthode d'interprétation naturaliste, nous demandons la permission d'admettre ici comme conforme à la réalité des faits, l'hypothèse d'une origine astronomique. Reconnaissons-la tout au moins préférable, puisque c'est la seule qu'on puisse mettre en avant et qu'il n'y en a pas d'autre à invoquer.

Sans doute, le caractère solaire ne se trouve pas aussi nettement indiqué dans Huitzilopotchli que dans Tezcatlipoca, emblème comme

(1) *Djemschid et Quetzalcoatl*, p. 263 et suiv. du t. IV des *Actes de la Société philologique* (Alençon 1874). — *Djemschid et Quetzalcoatl*, p. 241 et suiv. du t. VIII de la *Revue des Traditions populaires* (Paris 1893). — *Le Folklore dans les deux mondes*, p. 337 et suiv. en note, du t. XXIII des *Actes de la Société philologique* (Paris 1894).

(2) M. Cyrus Thomas, *The Maya Year* Washington, 1894).

(3) M. le D. H. Gaidoz, *l'Occulte chez les aborigènes de l'Amérique du Sud*, p. 54 et suiv. Paris 1895).

l'a établi M. G. Raynaud, du soleil d'hiver (1). Toutefois, nous n'hésiterons pas à reconnaître avec M. le Dr Seler, dans le fils de Coatlicuyé, la personnification du soleil de printemps, lequel dissipe les nuages figurés par les Centzon-Vitznahuas (2). S'il affectionne non moins que le génie de l'Annam, Dong, la couleur bleue, c'est que c'est la teinte ordinaire du ciel, lorsque l'astre du jour brille dans tout son éclat. D'autre part, nous voyons une preuve à l'appui de notre thèse dans ce fait que l'oiseau-mouche constitue en quelque sorte l'animal consacré à Huitzilopotchli (3), de même que dans la mythologie greco-latine, la chouette constituait l'oiseau de Minerve, le paon celui de Junon, etc. Certes, l'humeur batailleuse et agressive de ce volatile est bien connue. On le voit parfois donner la chasse à des oiseaux dix fois plus gros que lui et, dans la saison des amours, il devient d'une férocité qui étonne dans un si petit corps. En cette qualité, il méritait bien de servir d'emblème au dieu de la guerre et même de lui donner son nom. Il le méritait encore à un autre égard, ainsi que le remarque fort justement M. Seler. L'éclat de ses plumes fait songer naturellement à celui du feu et à celui de l'astre qui nous éclaire.

Que maintenant le nom et les attributs du Dieu *Huitzilopochtli* aient été transférés au chef de migration *Huitzitlon*, litt. « Petit oiseau-mouche » lequel guida, prétend la chronique, le peuple des Mexicas pendant cinquante-deux ans, c'est-à-dire juste la durée d'un demi-cycle, depuis le départ d'Aztlan jusqu'à l'arrivée à Tulan en Xocotitlan (3), rien d'étrange à cela. La ressemblance des deux noms prêtait assez à une confusion de la sorte et l'on n'ignore pas le rôle que le calembour joue dans la confection des légendes. Après tout, nous nous trouverions ici en présence d'un cas d'apothéose comme l'histoire en offre tant d'exemples, mais compliqué de ce que l'on pourrait justement appeler l'usurpation d'un nom divin. Mais n'avons-nous pas vu le pieux Enée recevoir les hommages religieux des peuples du Latium sous le nom de *Jupiter indigète* ? Du reste, une autre hypothèse, et qui semble peut-être encore plus acceptable, consisterait à tenir ce chef Huitzitlon comme un personnage purement légendaire n'ayant jamais eu d'existence réelle et dont le nom lui-même ne constituant qu'un dérivé de celui du Mars de la Nouvelle-Espagne, attesterait l'humeur belliqueuse de la tribu des *Mexicas*.

(1) M. G. Raynaud, *Les trois principales divinités mexicaines*, p. 181 et suiv. du n° 2 du t. XXIX de la Revue de *l'Histoire des religions* (Paris 1894).

(2) M. le Dr E. Seler, *Huitzilopochtli, dieu de la guerre chez les Aztèques*, p. 387 et suiv. du *Congrès des Américanistes*, 8e session (Paris 1890).

(3) *Annales de Chimalpain*, traduction de Rémi Siméon, *7e relation*, p. 269 (Paris 1889).

Somme toute, la légende qui fait l'objet du présent mémoire nous semble, comme tant d'autres, sortie d'une pure métaphore. On aura d'abord dit : « Le guerrier habitant l'azur dissipe ses ennemis » pour « le soleil chasse les nuages » puis, bâti sur cette donnée toute une thèse anthropomorphique.

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POUR L'AVANCEMENT DES SCIENCES

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From the PROCEEDINGS OF THE ROYAL SOCIETY, VOL. 62.

Mr. William Gates
Cuyoacan,
166637 Jan 20. 1918.

A MAYA CALENDAR INSCRIPTION, INTERPRETED BY GOODMAN'S TABLES.

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[*From the* PROCEEDINGS OF THE ROYAL SOCIETY, Vol. 62.]

"A Maya Calendar Inscription, interpreted by Goodman's Tables."

By ALFRED P. MAUDSLAY. Communicated by F. DUCANE GODMAN, F.R.S. Received April 2,—Read June 17, 1897.

[*Introductory Note.*

Our knowledge of the Maya Calendar is chiefly derived from the writings (A.D. 1566) of Diego de Landa, Bishop of Yucatan, who not only gave some account of the divisions of time in use among the Mayas, but also copied, somewhat roughly, in his manuscript the signs employed to represent the eighteen named months, and the twenty named days into which each month was divided.

Landa's statements are, however, by no means clear, and there has been much discussion both as to their correctness in themselves and as to the interpretation which has been given to them; moreover, it has been found difficult in some instances to identify the day and month signs given by him with those used in the Dresden Codex and the few Maya manuscripts which have been preserved, and still more difficult to identify them with the signs used in the carved inscriptions.

In the accompanying paper an examination is made of a recently discovered inscription, by the aid of calendar tables prepared by Mr. J. T. Goodman, and published with an explanatory essay in the 'Biologia Centrali-Americana.' These tables consist of a chronological and an annual calendar. The chronological calendar is based on the Ahau, a period of 360 days, and is divided thus:—

20 days	.....	1 chuen
18 chuens	.....	1 ahau* (360 days)

* It is unfortunate that the *ahau*, or period of 360 days, bears the same name as one of the twenty days of the Maya month, and that the *chuen*, or twenty-day period, bears the name of another day of the month.

20 ahaus	1 katun
20 katuns.....	1 cycle
13 cycles	1 great cycle
73 great cycles	1 grand era

The annual calendar is divided into eighteen named months, each consisting of twenty named days, and one short month (named Uayeb) of five days.

The twenty named days of the month are numbered continuously from 1 to 13, so that if the first-named day of the month has the number 1 attached to it, the last-named day of the month will be numbered 7 (13+7 = 20), and the first day of the next month will be numbered 8, and so on.

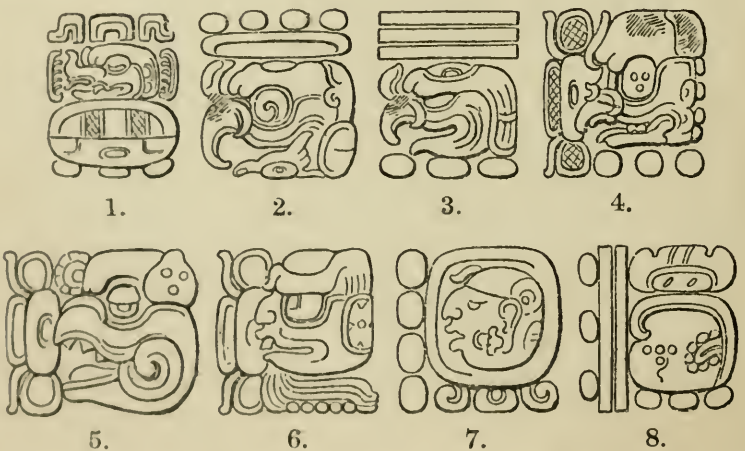
There are fifty-two annual calendars in a calendar round, and at the end of the 52nd year the series is repeated.

All the dates and reckonings found on the monuments which can be made out by the aid of these tables are expressed in Ahaus, Katuns, &c., and not in years; but Mr. Goodman maintains that the true year was known to the Mayas, and that it is by the concurrent use of the chronological and annual tables that the dates carved on the monuments can be properly located in the Maya Calendar.

All the dates which have as yet come under notice fall within the three Great Cycles, numbered by Mr. Goodman the 53rd, 54th, and 55th.

The following extract from an article in 'Nature' (July 8, 1897) gives a good example of the manner in which a date is expressed :—

"I called attention, some years ago, to the fact that the greater number of the carved inscriptions commenced with easily recognised series of glyphs with numerals or faces attached to them, which I called the Initial Series. Mr. Goodman now shows that the Initial Series expresses a date thus :—



(1) The Great Cycle sign. (2) The Cycle. (3) The Katun. (4) The Ahau. (5) The Chuen. (6) The Day. (7) The named day. (8) The named month

As has been long known, each bar counts as five, and each dot as a unit. (The roundish marks *under* the glyphs are not part of the numerical series.)

"The signs in front of the Ahau, Chuen, and Day signs denote a 'full count' of those periods. The date thus reads:—

(1.) 54th..... great cycle.
(2.) 9th..... cycle.
(3.) 15th..... katun.
(4.) 'Full count' ..... ahaus.
(5.) 'Full count' ..... chuens.
(6.) 'Full count' ..... days.
(7.) 4 Ahau (day).
(8.) 13 Yax (month).

"A reference to Mr. Goodman's chronological calendar shows that the 15th Katun of the 9th Cycle of the 54th Great Cycle commences with the day 4 Ahau, the 13th day of the month Yax, the date which is here given in the inscription. The combination 4 Ahau 13 Yax can only occur once in a period of fifty-two years.

"One of Mr. Goodman's discoveries is the system on which the Mayas numbered the different series of time divisions. For instance, the twenty Ahaus are not numbered 1, 2, 3, &c., up to 20, but they were numbered 20, 1 2, 3, &c., to 19.

"If we should nowadays wish to use a similar notation, we should probably number the series 0, 1, 2, &c., 19; but it seems as though the Mayas, having no sign for 0, wrote the sign for 20 or a 'full count' of Ahaus in the first place.

"The eighteen Chuens are in like manner numbered 18, 1, 2, 3, &c., to 17, the same sign being used for a 'full count' of Chuens as is used for a 'full count' of Ahaus.

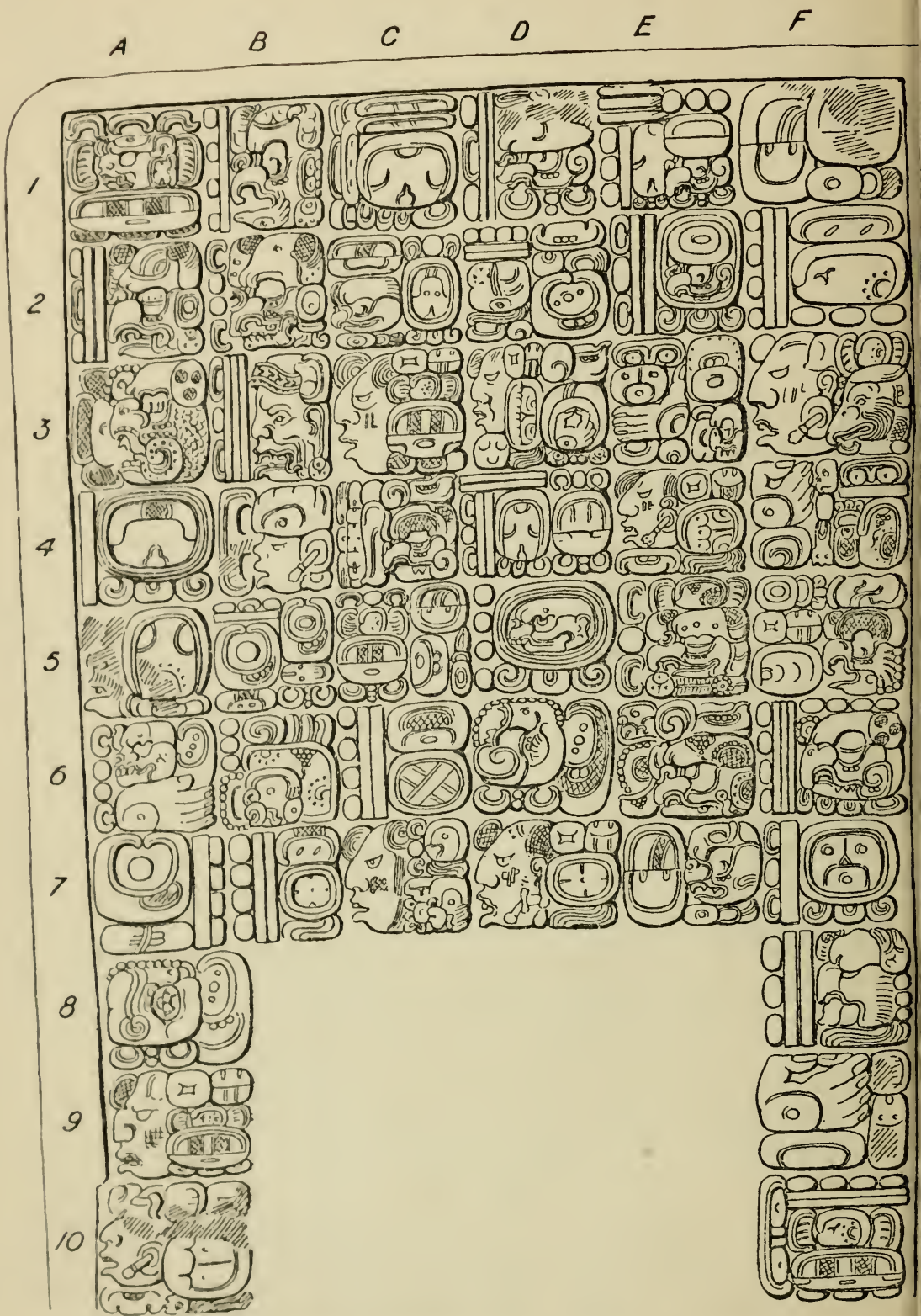
"As a 'full count' of days (twenty) is a Chuen, a 'full count' of Chuens (eighteen) is an Ahau, and a 'full count' of Ahaus (twenty) is a Katun. The foregoing inscription may be read thus:—

"The 15th Katun of the 9th Cycle with no odd Ahaus, Chuens, or days added, begins with 4 Ahau 13 Yax.

"Had the date been one including a specified number of Ahaus, Chuens, or Days, we should have had to make use of the annual calendar.

"The faces so frequently met with in the inscriptions in connexion with Cycle, Katun, and other signs for time periods are shown by Mr. Goodman to be in reality numerals, and the whole series of numeric faces from 1 to 20 has been determined in some cases with certainty, and in others with a fair degree of probability."—August 5, 1897.]

In the month of February, when the last pages of Mr. Goodman's



Maya Inscription from Piedras Negras.

(The glyphs are read downwards in double columns from left to right.)

essay (published in the Archæological Section of the 'Biologia Centrali-Americana') were issuing from the press, I received from Mr. Teobert Maler a number of photographs of sculptures and inscriptions which he had recently discovered in Yucatan and the country to the south of it as far as the banks of the River Usumacinta.

One of these inscriptions from Piedras Negras on the Usumacinta is in a good state of preservation, and a drawing made by Miss Annie Hunter from the photographic print is here reproduced (p. 70).

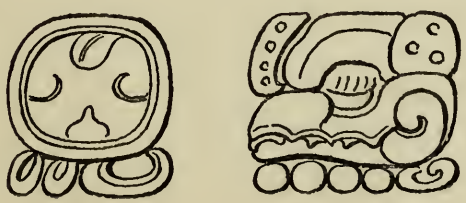
As Mr. Goodman has never seen this inscription, an examination of it with the help of his notes and calendar tables will be a fair test of their value.

The following signs are figured in Mr. Goodman's essay, and will be found to agree fairly well with those in the inscription.

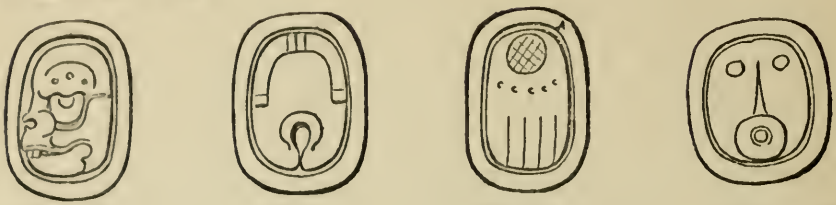
Cycle = 20 Katuns.

Katun = 20 Ahaus.

Ahau = 18 Chuens.

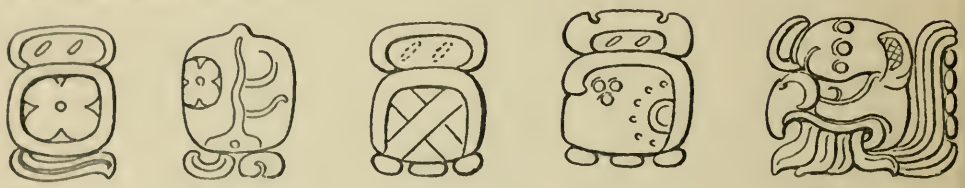
Chuen  = 20 Days.

Signs for the named days—



Cimi. Cib. Ymix. Ahau.

Signs for the named months—



Yaxkin. Kankin. Uo. Yax. Muan.

The glyph A 1 is the initial glyph indicating the Great Cycle. It has more the appearance of the sign for the 53rd than for that of the 54th Great Cycle, but the signs for the different Great Cycles are still in need of elucidation, and the subsequent reckoning shows clearly that the dates fall within the table given by Mr. Goodman as that of the 54th Great Cycle.

The next glyph B 1 is the Cycle sign with the numeral 9 in front of it (one bar = 5 and four dots = 4).

A 2 is the Katun sign with the numeral 12 in front of it (two bars = 10, and two dots = 2; the hollow curve between the two round dots is merely used to fill up the space, and does not count).

B 2 is the Ahau sign with the numeral 2.

Turning to the tables of Mr. Goodman's chronological calendar, of which an extract showing the 10th to the 14th Katuns of the 9th Cycle is here given, we find that the first day of the—

2nd Ahau,
12th Katun,
9th Cycle,
54th Great Cycle,

falls on the day 2 Ahau, the 18th day of the month Xul (which is underlined in the table).

This is as far as the chronological calendar can guide us. We have next to find the position of this date in the annual calendar. The date can only occur once in the fifty-two years which constitute a calendar round, and an examination of the tables shows that it falls in the first year of the calendar round (where it is marked with a square).

Nos. of the Katuns.. *10*				*11*			*12*			*13*			*14*			
No. of the Ahau.	No. of the day Ahau.	Day of the month.	Name of month.	No. of the day Ahau.	Day of the month.	Name of month.	No. of the day Ahau.	Day of the month.	Name of month.	No. of the day Ahau.	Day of the month.	Name of month.	No. of the day Ahau.	Day of the month.	Name of month.	No. of the Ahau.
20	1	8	Kayab	12	8	Ceh	10	8	Yaxkin	8	8	Uo	6	13	Muan	*20*
1	10	3	,,	8	3	,,	6	3	,,	4	3	,,	2	8	,,	*1*
2	6	18	Pax	4	18	Zac	2	18	Xul	13	18	Pop	11	3	,,	*2*
3	2	13	,,	13	13	,,	11	13	,,	9	13	,,	7	18	Kankin	*3*
4	11	8	,,	9	8	,,	7	8	,,	5	8	,,	3	13	,,	*4*
5	7	3	,,	5	3	,,	3	3	,,	1	3	,,	12	8	,,	*5*
6	3	18	Muan	1	18	Yax	12	18	Tzec	10	3	Uayeb	8	3	,,	*6*
7	12	13	,,	10	13	,,	8	13	,,	6	18	Cumhu	4	18	Mac	*7*
8	8	8	,,	6	8	,,	4	8	,,	2	13	,,	13	13	,,	*8*
9	4	3	,,	2	3	,,	13	3	,,	11	8	,,	9	8	,,	*9*
10	13	18	Kankin	11	18	Chen	9	18	Zotz	7	3	,,	5	3	,,	*10*
11	9	13	,,	7	13	,,	5	13	,,	3	18	Kayab	1	18	Ceh	*11*
12	5	8	,,	3	8	,,	1	8	,,	12	13	,,	10	13	,,	*12*
13	1	3	,,	12	3	,,	10	3	,,	8	8	,,	6	8	,,	*13*
14	10	18	Mac	8	18	Mol	6	18	Zip	4	3	,,	2	3	,,	*14*
15	6	13	,,	4	13	,,	2	13	,,	13	18	Pax	11	18	Zac	*15*
16	2	8	,,	13	8	,,	11	8	,,	9	13	,,	7	13	,,	*16*
17	11	3	,,	9	3	,,	7	3	,,	5	8	,,	3	8	,,	*17*
18	7	18	Ceh	5	18	Yaxkin	3	18	Uo	1	3	,,	12	3	,,	*18*
19	3	13	,,	1	13	,,	12	13	,,	10	18	Muan	8	18	Yax	*19*

Archaic Annual Calendar.
1st Year.

	Names of the months	Pop.	Uo.	Zip.	Zotz.	Tzec.	Xul.	Yaxkin.	Mol.	Chen.	Yax.	Zac.	Ceh.	Mac.	Kankin.	Muan.	Pax.	Kayab.	Cumhu.	Uayeb.	
	Names of the days.																				
20	Ik	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	*20*
1	Akbal	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	*1*
2	Kan	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	*2*
3	Chicchan	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	*3*
4	Cimi	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	*4*
5	Manik	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	..	*5*
6	Lamat	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	..	*6*
7	Muluc	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	..	*7*
8	Oc	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	..	*8*
9	Chuen	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	..	*9*
10	Eb	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	..	*10*
11	Ben	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	..	*11*
12	Ix	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	..	*12*
13	Men	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	..	*13*
14	Cib	2	9	3	10	4	11	(5)	12	6	13	7	1	8	2	9	3	10	4	..	*14*
15	Caban	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	..	*15*
16	Ezenab	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	..	*16*
17	Cauac	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	..	*17*
18	Ahau	6	13	7	1	8	[2]	9	3	10	4	11	5	12	6	13	7	1	8	..	*18*
19	Ymix	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	..	*19*

The next glyph in the inscription A 3 is the Chuen sign with the sign which signifies a "full count" of Chuens, in front of it. As a full count of Chuens is 18 and equals 1 Ahau, and as the number of Ahaus has already been recorded, the glyph A 3 means that no odd Chuens are to be added to the date already expressed.

The glyph B 3 is the sign for a day (of twenty-four hours) preceded by the numeral 16.

Turning to the first year of the annual calendar, we now add these 16 days to 2 *Ahau* 18 *Xul*, the date already arrived at, and it will be found to bring us to 5 *Cib* 14 *Yaxkin* (marked with a circle).

That this reckoning is correct is shown by the inscription itself where the result is expressed; A 4 being 5 *Cib*, and B 7 14 *Yaxkin*. The six glyphs in the inscription intermediate between the sign of the day Cib, and the sign of the month Yaxkin, have not yet been thoroughly deciphered, but there is reason to suppose that they contain a parallel reckoning differently expressed.

The next three glyphs are undeciphered; then comes another reckoning:—

C 1 is the Chuen sign with the numeral 10 (two bars = 10) above it, and a "full count" sign at the side. Whether the 10 applies to the Chuens or days can only be determined by experiment, and such experiment in this case shows that the reckoning intended to be expressed is 10 Chuens and a "full count" of days, that is for practical purposes 10 Chuens only, for as in the last reckoning when the full count of Chuens was expressed in the Ahaus, so here the full count of days is expressed in the Chuens.

The next glyph D 1 is an Ahau sign, preceded by the numeral 12.

This gives us—

12 Ahaus (12 × 360)	= 4320 days.	
10 Chuens (10 × 20)	= 200 ,,	
	4520 days.	
	4380 ,,	= 12 years.
	140 days.	

Adding 4520 days, or 12 years and 140 days, to the date 5 *Cib* 14 *Kankin*, it brings us to the date 1 *Cib* 14 *Kankin* in the thirteenth year of the annual calendar.

Turning to the inscription we find at C 2 (passing over the first half of the glyph), 1 *Cib* followed by (the first half of D 2) 14 *Kankin*, the date at which we have already arrived by computation.

13th Year.

	Names of the months	Pop.	Uo.	Zip.	Zotz.	Tzec.	Xul.	Yaxkin.	Mol.	Chen.	Yax.	Zac.	Ceh.	Mac.	Kankin.	Muan.	Pax.	Kayab.	Cumhu.	Uayeb.	
	Names of the days.																				
20	Ik	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	*20*
1	Akbal	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	*1*
2	Kan	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	*2*
3	Chicchan	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	*3*
4	Cimi	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	*4*
5	Manik	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	..	*5*
6	Lamat	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	..	*6*
7	Muluc	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	..	*7*
8	Oc	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	..	*8*
9	Chuen	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	..	*9*
10	Eb.....	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	..	*10*
11	Ben	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	..	*11*
12	Ix	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	..	*12*
13	Men	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	..	*13*
14	Cib	1	8	2	9	3	10	4	11	5	12	6	13	7	(1)	8	2	9	3	..	*14*
15	Caban	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	..	*15*
16	Ezenab	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	..	*16*
17	Cauac	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	..	*17*
18	Ahau.....	**5**	**12**	**6**	**13**	**7**	**1**	**8**	**2**	**9**	**3**	**10**	**4**	**11**	**5**	**12**	**6**	**13**	**7**	..	*18*
19	Ymix..	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	..	*19*

	Names of the months	Pop.	Uo.	Zip.	Zotz.	Tzec.	Xul.	Yaxkin.	Mol.	Chen.	Yax.	Zac.	Ceh.	Mac.	Kankin.	Muan.	Pax.	Kayab.	Cumhu.	Uayeb.	
	Names of the days.																				
20	Eb	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	*20*
1	Ben	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	*1*
2	Ix	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	*2*
3	Men	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	*3*
4	Cib	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	*4*
5	Caban	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	..	*5*
6	Ezenab	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	..	*6*
7	Cauac	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	..	*7*
8	Ahau	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	..	*8*
9	Ymix	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	..	*9*
10	Ik	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	..	*10*
11	Akbal	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	..	*11*
12	Kan	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	..	*12*
13	Chicchan	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	..	*13*
14	Cimi	10	(4)	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	..	*14*
15	Manik	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	..	*15*
16	Lamat	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	..	*16*
17	Muluc	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	..	*17*
18	Oc	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	..	*18*
19	Chuen	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	..	*19*

38th Year.

	Names of the months	Pop.	Uo.	Zip.	Zotz.	Tzec.	Xul.	Yaxkin.	Mol.	Chen.	Yax.	Zac.	Ceh.	Mac.	Kankin.	Muan.	Pax.	Kayab.	Cumhu.	Uayeb.	
	Names of the days.																				
20	Manik	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	*20*
1	Lamat	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	*1*
2	Muluc	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	*2*
3	Oc	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	*3*
4	Chuen	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	*4*
5	Eb	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	..	*5*
6	Ben	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	..	*6*
7	Ix	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	..	*7*
8	Men	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	..	*8*
9	Cib	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	..	*9*
10	Caban	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	..	*10*
11	Ezenab	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	..	*11*
12	Cauac	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	..	*12*
13	Ahau.....	12	6	13	7	1	8	2	9	3	10	4	11	5	12	(6)	13	7	1	..	*13*
14	Ymix.....	13	7	1	8	2	9	3	10	4	(11)	5	12	6	13	7	1	8	2	..	*14*
15	Ik	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	..	*15*
16	Akbal	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	..	*16*
17	Kan	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	..	*17*
18	Chicchan	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	..	*18*
19	Cimi	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	..	*19*

Passing over the next three glyphs we arrive at another reckoning, D 4 gives 10 days, 11 Chuens, 1 Ahau, and the first half of C 5 gives 1 Katun.

1 Katun	7200 days.
1 Ahau	360 „
11 Chuens (11 × 20)	220 „
10 Days	10 „
	7790 days.
	7665 „ = 21 years.
	125 days.

Adding 7790 days or 21 years and 125 days to the previous date, 1 *Cib* 14 *Kankin*, it will bring us to 4 *Cimi* 14 *Uo* in the thirty-fifth year of the annual calendar, and we find this date expressed in the inscription in the glyphs D 5 and C 6.

Passing over the next three glyphs we arrive at another reckoning (E 1), 3 Ahaus, 8 Chuens, 15 days:—

3 Ahaus	1080 days.
8 Chuens.....	160 „
15 Days.....	15 „
	1255 days.
	1095 „ = 3 years.
	160 days.

Adding 3 years and 160 days to the last date, 4 *Cimi* 14 *Uo*, brings us to 11 *Ymix* 14 *Yax* in the thirty-eighth year of the annual calendar; this is the date we find expressed in the glyphs E 2 and F 2 of the inscription.

It is true that in the sign in the glyph E 2 is not the sign usually employed for the day Ymix, but that it is a day sign we know from the fact that it is included in a cartouche, and I am inclined to think that the more usual Ymix sign (something like an open hand with the fingers extended) was inclosed in the oval on the top of the grotesque head, but it is too much worn for identification.

Passing over seven glyphs, the next reckoning occurs at F 6, which gives:—

4 Chuens	80 days.
19 Days	19 „
	99 days.

Adding 99 days to the last date, 11 *Ymix* 14 *Yax*, brings us to 6 *Ahau* 13 *Muan* in the same year, and we find this date expressed in F 7 and F 8.

The last glyph in the inscription is a Katun sign with the numeral 14 above it, and a sign for "beginning" in front of it, and indicates that the last date is the beginning of a 14th Katun. If we turn to the table for the 9th Cycle of the 54th Great Cycle, from which we started, it will be seen that the 14th Katun of that cycle does commence with the date 6 *Ahau* 13 *Muan*.

It is simply impossible that the identity of the dates expressed in the inscription with those to which the computations have guided us can throughout be fortuitous. Very nearly half of the forty-eight glyphs in the inscription have been accounted for, and I have no doubt that when the inscription passes under Mr. Goodman's scrutiny he will be able to give us much information about the remaining glyphs which I have passed over as undeciphered.

It can, I think, therefore, be fairly claimed for Mr. Goodman that his researches have raised the veil of mystery which has for so long hung over the carved hieroglyphic writing of the Mayas.

Harrison and Sons, Printers in Ordinary to Her Majesty, St. Martin's Lane.

#1

THE FOLK-LORE OF YUCATAN.

BY DANIEL G. BRINTON, M.D.

~~16617~~

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THE FOLK-LORE OF YUCATAN.

By Daniel G. Brinton, M.D.

YUCATAN presents a strange spectacle to the ethnologist. The native race, which in nearly every other part of the American continent has disappeared before the white invaders or else become their acknowledged inferiors, has there gained the upper hand. The native language has ousted the Spanish to that extent that whole villages of whites speak Maya only, and the fortunes of war in the last generation have sided so much with the native braves that they have regained undisputed possession of by far the larger part of the peninsula.

Is there to be recognised in this a revival of that inherent energy which prompted their ancestors to the construction of the most remarkable specimens of native architecture on the continent, and to the development of a ripe social and political fabric?

It can scarcely be doubted; but, however that may be, such considerations cannot fail to excite our interest in all that relates to a race of such plucky persistence.

As throwing a side-light on their mental constitution, their superstitions and folk-lore merit attention. I happen to have some material on this which has never been published, and some more which has only appeared in mediums quite inaccessible even to diligent students. Of the former are a manuscript by the Licentiate Zetina of Tabasco, a native of Tihosuco, and some notes on the subject by Don Jose Maria Lopez, of Merida, and the late Dr. Carl Hermann Berendt; while of the latter a report by Don Bartolomé Granado de Baeza, *cura* of Yaxcabá, written in 1813, and an article of later date by the learned cura, Estanislao Carrillo, are particularly noteworthy.* From

* *Informe del Señor Cura de Yaxcabá*, Don Bartolomé del Granado Baeza, in the *Registro Yucateco*, tomo i. pp. 165 *et seq.*

The Rev. Estanislao Carrillo was cura of Ticul, where he died in 1846. He was a zealous archaeologist, and is frequently mentioned by Mr. Stephens in his travels in Yucatan. He is deservedly included in the *Manual de Biografia Yucateca* of Don Francisco de P. Sosa (Merida, 1866). His article on the subject of the text appeared in the *Registro Yucateco*, tomo iv. p. 103.

these sources I have gathered what I here present, arranging and studying the facts they give, with the aid of several dictionaries of the tongue in my possession.

These Mayas, as the natives called themselves, were converted at the epoch of the conquest (about 1550) to Christianity in that summary way which the Spaniards delighted in. If they would not be baptized they were hanged or drowned; and, once baptized, they were flogged if they did not attend mass, and burned if they slid back to idol-worship. They were kept in the densest ignorance, for fear they should learn enough to doubt. Their alleged Christianity was therefore their ancient heathenism under a new name, and brought neither spiritual enlightenment nor intellectual progress. As a recent and able historian of Yucatan has said, "the only difference was that the natives were changed from pagan idolaters to Christian idolaters." *

To this day the belief in sorcerers, witchcraft, and magic is as strong as it ever was, and in various instances the very same rites are observed as those which we know from early authors obtained before the conquest.

The diviner is called *h'men*, a male personal form of the verb *men*, to understand, to do. He is the one who knows, and who accomplishes. His main instrument is the *zaztun*, "the clear stone" (*zaz*, clear, transparent; *tun*, stone). This is a quartz crystal or other translucent stone, which has been duly sanctified by burning before it gum copal as an incense, and by the solemn recital of certain magic formulas in an archaic dialect passed down from the wise ancients. It is thus endowed with the power of reflecting the past and future, and the soothsayer gazes into its clear depths and sees where lost articles may be recovered, learns what is happening to the absent, and by whose witchery sickness and disaster have come upon those who call in his skill. There is scarcely a village in Yucatan without one of these wondrous stones.

These wise men have also great influence over the growing crops,

* "De idolatras paganos que eran, solo se ha conseguido que se conviertan en idolatras cristianos."—Apolinar Garcia y Garcia, *Historia de la Guerra de Castas en Yucatan*, Prologo, p. xxiv. (Merida, 1865).

and in this direction their chiefest power is exercised. By a strange mixture of Christian and pagan superstition they are called in to celebrate the *misa milpera*, the "field mass" (*misa*, Spanish, "mass"; *milpera*, a word of Aztec derivation, from *milpa*, "cornfield"). In the native tongue this is called the *tich*, which means the offering or sacrifice. It is a distinct survival of a rite mentioned by Diego de Landa, one of the earliest bishops of the diocese of Yucatan.*

The ceremony is as follows: On a sort of altar constructed of sticks of equal length the native priest places a fowl, and, having thrown on its beak some of the fermented liquor of the country, the *pitarrilla*, he kills it, and his assistants cook and serve it with certain maize cakes of large size and special preparation. When the feast is ready, the priest approaches the table, dips a branch of green leaves into a jar of *pitarrilla*, and asperges the four cardinal points, at the same time calling on the three persons of the Christian Trinity, and the sacred four of his own ancient religion, the *Pah ah tun*. These mysterious beings were before the conquest and to this day remain in the native belief the gods of rain, and hence of fertility. They are identical with the winds, and the four cardinal points from which they blow. To each is sacred a particular colour, and in modern times each has been identified with a saint in the Catholic calendar. Thus Father Baeza tells us that the red Pahahtun is placed at the East, and is known as Saint Dominic; to the North is the white one, who is Saint Gabriel; the black, toward the West, is Saint James; the yellow is toward the South, and is a female, called in the Maya tongue *X'Kanleox*, "the yellow goddess," and bears the Christian name of Mary Magdalen.

The name *Pahahtun* is of difficult derivation, but it probably means "stone, or pillar, set up or erected," and this tallies quite exactly with a long description of the ancient rites connected with the worship of these important divinities in the old times. There are some discrepancies in the colours assigned the different points of the compass, but this appears to have varied considerably among the Central American nations, though many of them united in having some such symbolism.

* Landa, *Relacion de las Cosas de Yucatan*, pp. 208 *et seq.* The work of Landa was first printed at Paris in 1864.

A curious study of it has been made by the well-known archaeologist, the Count de Charencey.*

The invocation to these four points of the compass in its modern form was fortunately obtained and preserved in the original tongue by that indefatigable student, the late Abbé Brasseur de Bourbourg, while on a visit to the plantation of Xcanchakan, in the interior of Yucatan.† The translation of it runs as follows:—

"At the rising of the Sun, Lord of the East, my word goes forth to the four corners of the heaven, to the four corners of the earth, in the name of God the Father, God the Son, and God the Holy Ghost.

"When the clouds rise in the east, when he comes who sets in order the thirteen forms of the clouds, the yellow lord of the hurricane, the hope of the lords to come, he who rules the preparation of the divine liquor, he who loves the guardian spirits of the fields, then I pray to him for his precious favour, in the name of God the Father, God the Son, and God the Holy Ghost.

"I confide this virgin seed to the ground with my holy love, and I beg of thee to extend to me thy blessing with thy whole heart and thy pure love, and to insure me thy kindly favour; for I trust all in the hands of God the Father, God the Son, and God the Holy Ghost."

Such is an example of the strange mixture of heathen and Christian superstition which has been the outcome of three centuries of so-called Christian instruction!

There still continue to be relics of an ancient form of fire-worship which once prevailed commonly throughout the peninsula. The missionaries refer to it as "the festival of fire," ‡ but the exact rites performed were so carefully concealed that we have no description of them. That they are not yet out of date is apparent from a copy of a

* Charencey, *Des Couleurs considérées comme Symboles des Points de l'Horizon chez les Peuples du Nouveau-Monde*, in the *Actes de la Société Philologique*, tome vi. (Octobre, 1876).

† *Chrestomathie de Littérature Maya*, p. 101, in the second volume of the *Études sur le Système Graphique et la Langue des Mayas* (Paris, 1870).

‡ "La fiesta de fuego, que hasta ahora en esta provincia se hacia."—Fr. Diego Lopez Cogolludo, *Historia de Yucatan*, tomo i. p. 483 (3rd ed. Merida, 1867).

native calendar for 1841-2, obtained by Mr. Stephens when in Yucatan. In it the days are marked as lucky or unlucky, and against certain ones such entries are made as "now the burner lights his fire," "the burner gives his fire scope," "the burner takes his fire," "the burner puts out his fire." This burner, *ah toc*, is the modern representative of the ancient priest of the fire, and we find a few obscure references to an important rite, the *tupp kak*, extinction of the fire, which was kept up long after the conquest, and probably is still celebrated in the remoter villages. The sacred fire in ancient Maya land is said to have been guarded by chosen virgins, and it appears in some way to have been identified with the force which gives life to the animal and vegetable world.

Another of the modern ceremonies which is imbued with the old notion, common to them as to all primitive people, of a soul with material wants, is that called "the feast of the food of the soul." Small cakes are made of the flesh of hens and pounded maize, and are baked in an underground oven. Of these as many are placed on the altar of the church as the person making the offering has deceased relatives for whose well-being he is solicitous. These cakes are called *hanal pixan*, "the food of the soul." Evidently they are intended to represent the nourishment destined for the soul on its journey through the shadowy lands of death.

Along with these there are many minor superstitions connected especially with the growth of crops and fruits. Thus it is widely believed that the fruit known as the white zapote (*Sapota achras*, in Maya, *choch*) will not ripen of itself. One must tap it lightly several times as it approaches maturity, repeating the formula :—

Hoken, cheché ; ocen, takan :
Depart, greenness : enter, ripeness.

The owl is looked upon as an uncanny bird, presaging death or disease, if it alights on or even flies over a house. Another bird, the *cox*, a species of pheasant, is said to predict the approach of high northerly winds, when it calls loudly and frequently in the woods ; though this, according to one writer, is not so much a superstition as an observation of nature, and is usually correct.

A singular ceremony is at times performed to prevent the death of

those who are sick. The dread being who in mediæval symbolism was represented by a skeleton is known to the Mayas as *Yum Cimil*, Lord of Death. He is supposed to lurk around a house where a person is ill, ready to enter and carry off his life when opportunity offers. He is, however, willing to accept something in lieu thereof, and to bring about this result the natives perform the rite called *kex*, or "barter." They hang jars and nets containing food and drink on the trees around the house, repeating certain invocations, and they believe that often the Lord of Death will be satisfied with these, and thus allow the invalid to recover.

Those diviners to whom I have alluded are familiarly known as *Tat Ich*, Daddy Face, and *Tata Polin*, Daddy Head, a reference, I suspect, to a once familiar name of a chief divinity, *Kin ich*, the face (or eye) of the day, *i. e.* the Sun.

A power universally ascribed to these magicians is that of transforming themselves into beasts. Were it not for so many examples of delusions in enlightened lands it would be difficult to explain the unquestioning belief which prevails on this subject throughout Central America. Father Baeza relates that one of these old sorcerers declared in a dying confession that he had repeatedly changed himself into various wild beasts. The English priest, Thomas Gage, who had a cure in Guatemala about 1630, tells with all seriousness a number of such instances. And even in our own days the learned Abbé Brasseur de Bourbourg is not entirely satisfied that animal magnetism, ventriloquism, and such trickery, can explain the mysteries of *nagualism*, as the Central American system of the black arts is termed. He is not certain that we ought to exclude the assistance of the invisible diabolic agencies ! *

The sacred books of the Kiches, a tribe living in Guatemala related to the Mayas, ascribe this power to one of their most celebrated kings. As an illustration the passage is worth quoting :

"Truly this Gucumatz became a wonderful king. Every seven

* Thomas Gage, *A New Survey of the West Indies*, pp. 377 *et seq.* (London, 1699). The Abbé Brasseur is willing to consider these tales fictitious, "supposé qu'ils n'eussent eu, en realité, aucune communication avec les puissances du monde invisible," about which, however, he is evidently not altogether sure.— *Voyage sur l'Isthme de Tehuantepec*, p. 175 (Paris, 1862).

days he ascended to the sky, and every seven days he followed the path to the abode of the dead ; every seven days he put on the nature of a serpent and he became truly a serpent ; every seven days he put on the nature of an eagle and again of a tiger, and he became truly an eagle and a tiger ; every seven days also he put on the nature of coagulated blood, and then he was nothing else but coagulated blood." *

Men and women alike might possess this magic power. This is shown in a curious little native story heard by Dr. Berendt in the wilds of Yucatan from a native woman, who told it to prove the value of *salt* as a counter charm to the machinations of these mysterious beings. The doctor wrote it down with scrupulous fidelity and added a verbal translation. As it has never been published, and as it is at once an interesting bit of authentic folk-lore, and a valuable example of the Maya language, I give it here in the original tongue and with a literal, interlinear translation :—

A MAYA WITCH STORY.

Huntu hxib tsoocubel yetel huntul xchup ; ma tu yoheltah uaix
A man married with a woman ; not did he know (her) as
uay. Hunpe kin tu yalahti : " Huche capel mut taab." Tu
a witch. One day he said to her : " Mix two measures (of) salt." She
huchah paibe, ca tu katah : " Baax tial tech ? " Hunpel akab
mix'd (them) first, then she asked : " Why this (wishest) thou ? " One night
pixaan hxibe ca tu yilah u hokol u yatan. Ca tu chaah u mazcabe
woke the man and he saw go out his wife. Then he took his axe
ca tu mucul thulbelah tu pach ti kax. Ca kuchioob ti chichan
and secretly followed behind (her) to the wood. When they arrived at a little
chakan, yan u zazil uh, ca tu mucuba hxib tu booy nohoch
meadow, there being a bright moon, then hid himself the man in the shade of a great
yaxche. Ca tu pucah u nok xchup tu pach, uaan xmabuc tu
seiba tree. Then threw her garments the woman behind (her), standing naked in the
tan uh : ca tu sipah u yothel, ca culhi chembac. Ca
face of the moon : then she stripped off her skin, and remained mere bones. Then
naci ti caan. Ca emi tucaten, ca tu yalahi : " Zazaba
she rose to the sky. When she came down again, then she said to him : " Wouldst thou
xtac caan ? " Hemac ma uchuc u nacal tucaten, tumen tu thootal
reach to the sky ?" But not could she ascend again, because of the throwing
taab.
(of) salt.

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* *Popol Vuh le Livre Sacré des Quiches*, p. 315 (Paris, 1864).

To the Maya, the woods, the air, and the darkness are filled with mysterious beings who are ever ready to do him injury or service, but generally injury, as the greater number of these creations of his fancy are malevolent sprites.

Of those which are well disposed the most familiar are the *Balams* (Maya, *Hbalamob*, masculine plural form of *balam*). This word is the common name of the American tiger, and as a title of distinction was applied to a class of priests and to kings. The modern notions of the Balams are revealed to us by the Licentiate Zetina of Tihosuco in his manuscripts to which I have previously referred.

He tells us that these beings are supposed to be certain very ancient men who take charge of and guard the towns. One stands north of the town, a second south, a third east, and the fourth to the west. They are usually not visible during the day, and if one does see them it is a sign of approaching illness, which suggests that it is the disordered vision of some impending tropical fever which may occasionally lead to the belief in their apparition.

At night the Balams are awake and vigilant, and prevent many an accident from befalling the village, such as violent rains, tornadoes, and pestilential diseases. They summon each other by a loud, shrill whistle; and, though without wings, they fly through the air with the swiftness of a bird. Occasionally they have desperate conflicts with the evil powers who would assail the town. The signs of these nocturnal struggles are seen the next day in trees broken down and uprooted, the ground torn up, and large stones split and thrown around.

Another of their duties is to protect the cornfields or *milpas*. It seems probable, from comparing the authorities before me, that the Balams in this capacity are identical with the *Pa ahtuns*, whom I have referred to above, and that both are lineal descendants of those agricultural deities of the ancient Mayas, the *Chac* or *Bacab*, which are described by Bishop Landa and others. No Indian on the peninsula neglects to propitiate the Balam with a suitable offering at the time of corn-planting. Were he so negligent as to forget it, the crop would wither for lack of rain or otherwise be ruined.

An instance of this is told by Señor Zetina. An Indian near Tiho-

suco had paid no attention to the usual offering, perhaps being infected with evil modern sceptical views. His crop grew fairly; and as the ears were about ripening he visited his field to examine them. As he approached he saw with some dismay a tall man among the stalks with a large basket over his shoulders, in which he threw the ripening ears as fast as he could pluck them. The Indian saluted him hesitatingly. The stranger replied, "I am here gathering in that which I sent." Resting from his work, he drew from his pocket an immense cigar; and, taking out a flint and steel, began to strike a light. But the sparks he struck were flashes of lightning, and the sound of his blows was terrible thunderclaps which shook the very earth. The poor Indian fell to the ground unconscious with terror; and when he came to himself a hail-storm had destroyed his corn, and as soon as he reached home he himself was seized with a fever which nigh cost him his life.

The Balams are great smokers, and it is a general belief among the Indians that the shooting stars are nothing else than the stumps of the huge cigars thrown down the sky by these giant beings.

Sometimes they carry off children for purposes of their own. When Dr. Berendt was exploring the east coast of Yucatan he was told of such an occurrence on the Island of San Pedro, north of Belize. A little boy of four years wandered to some cacao bushes not more than fifty yards from the house, and there all trace of him was lost. There was no sign of wolf or tiger, no footprint of kidnapper. They sought him the whole day in vain, and then gave up the search, for they knew what had happened—the Balam had taken him!

The Balams have also the reputation of inculcating a respect for the proprieties of life. Zetina tells this story which he heard among his native friends: One day an Indian and his wife went to their corn-patch to gather ears. The man left the field to get some water, and his wife threw off the gown she wore lest it should be torn, and was naked. Suddenly she heard some one call to her in a loud voice, *Pixe avito, xnoh cizin*, which Zetina translates literally into Spanish, *Tapa ta culo, gran diablo!* At the same time she received two smart blows with a cane. She turned and beheld a tall man with a long beard, and a gown which reached to his feet. This was the Balam.

He gave her two more smart blows on the part of the person to which he had referred, and then disappeared ; but the marks of the four blows remained as long as she lived.

It is vain to attempt to persuade the Indian that such notions are false and cannot be facts. He will not try to reason with you. He contents himself with a patient gesture and the despairing exclamation, *Bix ma hahal:* "How can it be otherwise than true?" (*Bix*, how, *ma*, not, *hahal*, true.)

These Balams are in fact the gods of the cardinal points and of the winds and rains which proceed from them, and are thus a survival of some of the central figures of the ancient mythology. The wind still holds its pre-eminence as a supernatural occurrence in the native minds. One day Dr. Berendt was travelling with some natives through the forests when the sound of a tropical tornado was heard approaching with its formidable roar through the trees. In awe-struck accents one of his guides said, "*He cutal nohoch yikal nohoch tat:* Here comes the mighty wind of the Great Father." But it is only in an unguarded moment that in the presence of a white man the Indian betrays his beliefs, and no questioning could elicit further information. A hint is supplied by Señor Zetina. He mentions that the whistling of the wind is called, or attributed to *tat acmo*, words which mean Father Strong-bird. This suggests many analogies from the mythologies of other races ; for the notion of the primeval bird, at once lord of the winds and father of the race, is found in numerous American tribes, and is distinctly contained in the metaphors of the first chapter of Genesis.

The *balam*, as I have said, is esteemed a kindly and protective being ; he is affectionately referred to as *yum balam*, Father Balam. He is said to have a human form, that of an old man with a long beard and ample flowing robes. But there are other gigantic spectres of terrible aspect and truculent humour. One of these is so tall that a man cannot reach his knees. He stalks into the towns at midnight, and planting his feet like a huge Colossus, one on each side of the roadway, he seizes some incautious passer-by and breaks his legs with his teeth, or conquers him with a sudden faintness. The name of this terror of late walkers is Giant Grab, *Ua ua pach.*

Another is the *Che Vinic*, the Man of the Woods, called by the Spanish population the Salonge. He is a huge fellow without bones or joints. For that reason if he lies down he cannot rise without extreme difficulty; hence he sleeps leaning against a tree. His feet are reversed, the heels in front, the toes behind. He is larger and stronger than a bull, and his colour is red. In his long arms he carries a stick the size of a tree-trunk. He is on the watch for those who stray through the woods, and, if he can, will seize and devour them. But a ready-witted man has always a means of escape. All he has to do is to pluck a green branch from a tree, and waving it before him begin a lively dance. This invariably throws the Wood Man into convulsions of mirth. He laughs and laughs until he falls to the ground, and once down, having no joints, he cannot rise, and the hunter can proceed leisurely on his journey. It is singular, Dr. Berendt, how widely distributed is the belief in this strange fancy. It recurs in precisely the same form in Yucatan, in Peten, in Tabasco, around Palenque, &c.

Another ugly customer is the *Culcalkin*. This word means "the priest without a neck," and the hobgoblin so named is described as a being with head cut off even with the shoulders, who wanders around the villages at night, frightening men and children.

In contrast to the giants are the dwarfs and imps which are ready in their malicious ways to sour the pleasures of life. The most common of these are the *h'lox*, or more full *h'loxkatob*, which means "the strong clay images."* They are, indeed, believed to be the actual idols and figures in clay which are found about the old temples and tombs, and hence an Indian breaks these in pieces whenever he finds them, to the great detriment of archæological research. They only appear after sunset, and then in the shape of a child of three or four years, or sometimes not over a span in height, naked except wearing a large hat. They are swift of foot, and can run backwards as fast as forwards.

* The derivation of this word is from *kat*, which in the *Diccionario Maya-Espanol del Convento de Motul*, MS. of about 1580, is defined as "la tierra y barro de las olleras," but which Perez in his modern Maya dictionary translates "ollas ô figuras de barro"; *ob*, is the plural termination; *lox*, is strong, or the strength of anything; *h'* or *ah*, as it is often written, is the rough breathing which in Maya indicates the masculine gender.

Among other pranks, they throw stones at the dogs and cause them to howl. Their touch produces sickness, especially chills and fever. It is best, therefore, not to attempt to catch them.

Of similar malevolent disposition is the *Chan Pal*, Little Boy, who lurks in the woods and is alleged to bring the small pox into the villages.

Others are merely teasing in character, and not positively harmful. Thus there is the *X bolon thoroch* who lives in the house with the family, and repeats at night the various sounds of domestic labour which have been made during the day. The word *thoroch* is applied to the sound caused by the native spindle revolving in its shaft; *bolon* is "nine," a number used to express the superlative degree in certain phrases; while the initial *X* shows that the imp is of the feminine gender. The name therefore signifies "the female imp who magnifies the sound of the spindle." Other such household imps are the *Bokol h'otoch*, Stir-the-House, who creeps under the floors and makes a noise like beating a cake to scare the inmates; the *Yancopek*, Pitcher-Imp, who crawls into jars and jugs; and the *Way cot*, Witch-bird, who lurks on or behind walls and drops stones on passers by.

The female sex is further represented in the Maya folk-lore by a personage who has a curious similarity to legendary ladies of the old world, sirens, mermaids, the Lorelei, and others. She is called *X tabai*, the (female) Deceiver. Her home is under shady bowers in the forests, and there the ardent hunter suddenly espies her, clothed, and combing with a large comb (*X ache*) her long and beautiful hair. As he approaches she turns and flees, but not with discouraging haste, rather in such a manner and with such backward glances as to invite pursuit. He soon overtakes her, but just as he clasps her beauteous form in his strong embrace, her body changes into a thorny bush, and her feet become claws like those of a wild fowl. Torn and bleeding he turns sadly homeward, and soon succumbs to an attack of fever with delirium.

Another very similar creature is *X Thoh Chaltun*, Miss Pound-the-Stones. She slily waits around the villages, and when she sees some attractive youth she awakes his attention by tapping on the stones, or in default of these on an empty jar which she carries for the purpose. Does the foolish youth respond to the seductive invitation she coyly

moves to the woods, where the amorous pursuer meets like disappointment and a similar sad fate as the victim of the *X tabai*.

As may be supposed, many superstitions cling around the animal world. Each species of brute has its king, who rules and protects it Even the timid native hare may thus assert its rights. An Indian told Dr. Berendt that once upon a time a hunter with two dogs followed a hare into a cave. There he found a large hole leading under the earth. He descended, and came to the town of the hares. They seized him and his dogs and brought him before their king, and it was no easy matter for him to get off by dint of protests and promises.

There are also tales of the Straw Bird or Phantom Bird. The hunter unexpectedly sees a handsome bird on a branch before him. He fires and misses. He repeats his shot in vain. After a while it falls of itself, and proves to be nothing but a coloured feather. Then he knows that he has been fooled by the *Zohol chich*.

An object of much dread is the Black Tail, *Ekoneil*, an imaginary snake with a black, broad, and forked tail. He glides into houses at night where a nursing mother is asleep ; and, covering her nostrils with his tail, sucks the milk from her breasts.

These are probably but a small portion of the superstitions of the modern Mayas. They are too reticent to speak of these subjects other than by accident to the white man. He is quite certain either to ridicule or to reprove such confidences. But what is above collected is a moderately complete, and certainly, as far as it goes, an accurate notion of their folk-lore.

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The Folk-Lore Record, Vol. I. 8vo. pp. xvi. 252. [Issued to Members only.]
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ON THE AGE OF MAYA RUINS

BY

CHARLES P. BOWDITCH

(From the American Anthropologist (N. S.), Vol. 3, October–December, 1901)

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1901

ON THE AGE OF MAYA RUINS

By CHARLES P. BOWDITCH

The inscription lately discovered in Chichen Itza by Edward H. Thompson, United States Consul at Merida, is of more than passing interest. It contains an Initial Series of glyphs, which, so far as I know, gives the only initial date that has been found in the northern part of Yucatan.

Although it may be a matter of doubt on what date the long count declared by the Initial Series began, yet, if we assume that the majority of the initial dates refer to the time when the buildings or stelæ on which the dates occur were erected (and this assumption seems altogether probable), we can at least decide on the relative age of the ruined cities in which the buildings or stelæ are found.

The great cycle glyph in the Chichen Itza date is somewhat injured, but it is apparently of the same character as those found elsewhere. The numbers of the cycle, katun, tun, and uinal periods are 10, 2, 9, and 1, respectively. The number of the kin period is a face which, from the circle of dots around the mouth, is pretty surely 9. The day number is 9 and the month number is 7. The day glyph is somewhat obscure, but contains a circular frame supported by a knot, while the month glyph is pretty surely Zac. We can then be sure of the following: ?. 10. 2. 9. 1. ?, 9. ?. 7. ?., with the probability that the second ? should be replaced by 9 and the last ? should be replaced by Zac. Assuming for the moment that the great cycle sign is what Goodman calls 54, we find from the tables that 54. 10. 2. 9. 0. 0. is 6 Ahau 18 Chen (49), and that 54. 10. 2. 9. 1. 0. is 13 Ahau 18 Yax (49). Now, in order to reach a day with the number

9 and a month day with the number 7 from 13 Ahau 18 Yax, we must add 9 days. This makes the date necessarily 54. 10. 2. 9. 1. 9., 9 Muluc 7 Zac (49). The day sign, though rubbed, has the characteristics of Muluc, and the month is shown to be surely Zac; the kin number is also proved to be 9.

There is just a possibility that the great cycle may not be 54. If it is 53, the date must be 9 Muluc 12 Muan; if it is 55, the date must be 9 Muluc 2 Yaxkin; but the month number is clearly 7, which eliminates both these great cycle numbers. In order to find a great cycle with the numbers ?. 10. 2. 9. 1. 9, 9. ?. 7. ?, we should have to go back or forward from Great Cycle 54 at least five great cycles, which means over 25,000 years. This is such an enormous distance that it can practically be thrown out of consideration, and we may be well satisfied that the great cycle is really the same period in which almost every one of the other dates occurs, viz., 54.

It will be interesting to compare this date with the first and last known dates of the other ruined cities of Chiapas and Guatemala. I give a list of these dates:

	Earliest	Latest	Period of Existence
Piedras Negras	54.9. 8.10.6.16.	54.9.12. 2. 0.16.	3.11.12. 0.
Copan	54.9. 6.10.0. 0.[1]	54.9.16.10. 0. 0.	10. 0. 0. 0.
Quirigua	54.9.14.13.4.17.[2]	54.9.19.13. 0.12.	4.19.13.15.
Yaxchilan	54.9. 0.19.2. 4.[3]		
Palenque	54.9. 4. 0.0. 0.[4]	54.9. 8. 9.13. 0.	4. 9.13. 0.

The above collation establishes the fact that Piedras Negras,

[1] The date of Stela D given by Goodman as 54. 9. 5. 5. 0. 0. is almost surely 54. 9. 15. 5. 0. 0.

[2] The dates 54. 13. 0. 0. 0. 0. and 54. 9. 1. 0. 0. 0. may well be traditional and not historical, and refer to a period lying far in the past.

[3] This date on Lintel 22 is very clear, but as it is the only one which I have seen, I omit it in the following discussion. If historical, it is earlier than the earliest date of Quirigua except that of the normal date 54. 13. 0. 0. 0. 0., 4 Ahau 8 Cumhu.

[4] The dates of the Temple of the Cross, Temple of the Sun, and Temple of the Foliated Cross are almost surely traditional. The date on the Palace Steps, given by Goodman as 55. 3. 18. 12. 15. 12., should undoubtedly be 54. 9. 8. 9. 13. 0.

Copan, Palenque, and Quirigua flourished contemporaneously for at least a part of their existence, for the last known date of Palenque is but 0. 11. 16, or less than one year before the first known date of Piedras Negras. This does not necessarily mean that Palenque was deserted at the establishment of Piedras Negras. Of course as investigation proceeds other inscriptions may be discovered which may give earlier or later dates, but it is interesting to note the relation between the known dates of all these cities.

The date of Chichen Itza is later than any of the dates found above. The following list shows the distance from the earliest and latest dates of the ruined cities of Chiapas and Guatemala to the date recently found in Chichen Itza.

DISTANCE OF THE EARLIEST AND LATEST DATES TO THE DATE OF CHICHEN ITZA

	Earliest	Latest
Piedras Negras	13.18.12.13, 274 y. 323 d.	10. 7.0.13, 204 y. 73 d.
Copan	15.19. 1. 9, 314 y. 259 d.	5.19.1. 9, 117 y. 164 d.
Quirigua	7.15.14.12, 153 y. 247 d.	2.16.0.17, 55 y. 102 d.
Palenque	18. 9. 1. 9, 364 y. 9 d.	13.19.6. 9, 275 y. 194 d.

The Book of Chilan Balam of Mani[1] states that on Katun 13 the people whose history is recorded in this book reached Chacnouitan eighty years after leaving Nonaual, and that on Katun 6 of the following cycle Chichen Itza was discovered, and that on Katun 11 of the second following cycle they removed to Chichen Itza, having remained at Chacnouitan ninety-nine years. The distance from Katun 13 of one cycle to Katun 6 of another is 200 tuns, or about 197 years. The distance from Katun 13 of one cycle to Katun 11 of the second following cycle is 280 tuns or about 276 years.

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[1] *The Maya Chronicles*, D. G. Brinton, Phil'a, 1882, p. 87.

First date of Piedras Negras,	54.9.8.10.6.16	3.11.12. 0. = 70 y. 250 d.	13.18.12.13 = 274 y. 323 d.
Last date of Piedras Negras,	54.9.12.2.0.16		
First date of Quirigua,	54.9.14.13.4.17	4.19.13.15 = 98 y. 145 d.	
Last date of Quirigua,	54.9.19.13.0.12		
Chichen Itza,	54.10.2.9.1.9	2.16.0.17. = 55 y. 102 d.	

The coincidences of dates are remarkable when it is seen that the length of time from the first date of Piedras Negras to that of Chichen Itza is $278\frac{2}{3}$ tuns, while the time between the arrival at Chacnouitan to the removal to Chichen Itza is given by the Book of Chilan Balam as 280 tuns. More than this, if an inscription should be found hereafter in Piedras Negras recording a date as late as 54. 9. 13. 9. 6. 16, this would show a stay in Piedras Negras of 99 tuns, the time given in the manuscript for the stay at Chacnouitan, and if about 54. 9. 13. 9. 6. 16, the people of Piedras Negras deserted that city, they would have passed 204 years and 73 days before arriving at Chichen Itza. Now, all the historical dates of Quirigua lie between this last date and that of their arrival at Chichen Itza. Could the people of Piedras Negras have passed over to Quirigua and occupied that city during a part of this period of 204 years?[1]

Such speculations may not be of great value, but if they excite enough interest to induce a more thorough investigation, they will not be absolutely useless.

---

[1] If, however, we accept the date of 54. 9. 1. 0. 0. 0. in Quirigua as historical, as I was inclined to think when I wrote "Memoranda on the Maya Calendars used in the Books of Chilan Balam," the foundation of Quirigua would be anterior to all the dates which I have used in the above calculations.

n.C.

ELEMENTS OF THE MAYA

AND

MEXICAN ZODIACS.

BY

STANSBURY HAGAR,
NEW YORK.

SEPARAT-ABDRUCK AUS DEN VERHANDLUNGEN
DES XVI. INTERNATIONALEN AMERIKANISTEN-KONGRESSES.

WIEN 1909.
A. HARTLEBEN'S VERLAG.

Elements of the Maya and Mexican Zodiacs.

By **Stansbury Hagar**-New York.

In entering upon the study of the Maya and Mexican Zodiacs the writer desires to express his gratitude do Doctors *Seler* and *Schellhas* for studies which have greatly simplified his task. For a like reason he is indebted to the late Dr. *Förstemann* and to Dr. *Fewkes*, to Mrs. *Nuttall* and other Mexicanists, and to Professor *Saville* for references. If he at times differs from the expressed opinion of some of these authorities, he does so with confidence only because he is rather within the field of astronomical symbolism than in that of Mexican antiquities.

The principal original sources of information upon the Mexican and Mayan Zodiacs are the Nahuan Codices, Borgian, Vaticanus 3773 and Bologna, the Maya Codex of Dresden and the works of *Tezozomoc, Sahagun*, *Landa* and *Lizana;* the Codices being reproduced in the second and third volumes of Lord *Kingsborough's* great work upon Mexican antiquities and the Vaticanus Codex 3773 more recently by Doctor *Seler* acting for the Duke of *Loubat.* The material derived from these sources may be divided into six groups; the first consisting of the five constellations, which the Mexican king, at the time of his election, was exhorted to rise at midnight to observe. These constellations are described in an address to the king given by *Tezozomoc* and reproduced by *Seler* in his paper on the Venus Period in the Picture Writings of the Borgian Codex Group translated and republished in the 28th Bulletin of the Bureau of American Ethnology. The same constellations are more fully described by *Sahagun* in the Mexican text of his original manuscript, now in the Biblioteca del Palacio at Madrid. His descriptions are accompanied by drawings, three of which are definitely identified by the Mexican names attached to them, and the remaining

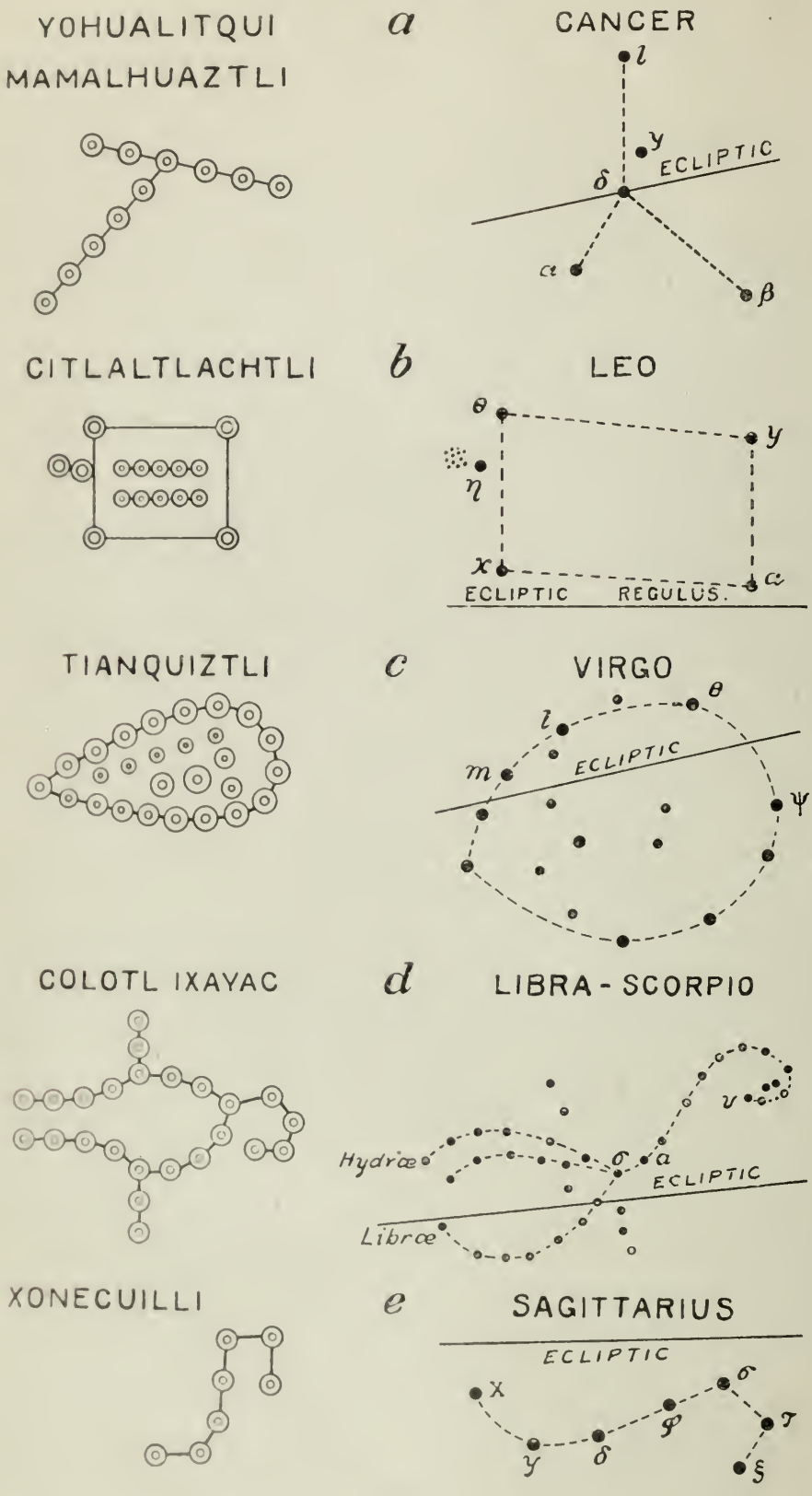

Fig. 1. *Sahagun*'s zodiacal asterisms and their corresponding constellations.

two are correctly identified by *Seler* in his reproductions, although farther on in his paper he suggests an interchange.

The writer identifies these five asterisms, in the order in which they are named by *Tezozomoc*, with the six zodiacal signs from Cancer to Sagittarius inclusive. *Sahagun's* figure of the scorpion shows clearly that it included the stars of both Libra and Scorpio, hence five figures represent six signs. As all six signs are visible at midnight only in the middle of May, the ceremony described by *Tezozomoc* must have taken place then. Annually at this time during the uinal or twenty-day period Pax, the Maya, nobles and priests listened to a long address upon their duty to celebrate the various religious festivals in honor of the gods. The exhortations to the Mexican king may have been similarly repeated during this month.

In the same paper *Seler* also calls attention to a series of five pictographs which occur in the same sequence and with but slight variation in all the above named codices. They represent figures with human forms, but in some instances with animal or death's heads, hurling spears successively at a water goddess, tiger, maize goddess, soothsayer, and warrior. In the Borgians and Dresden Codices the spear throwers are placed above the objects struck, and, in the latter codex, there is a human figure above each spear thrower, who is probably only a variant form. In Vaticanus 3773 the spear throwers are placed to the right of the objectsstruck, in the Codex Cospiano (Bologna) to the left, and in both codices all five are identical or nearly so. Following the order in which the figures are found, the objects struck represent the same zodiacal signs from Cancer to Sagittarius inclusive, the soothsayer standing for both Libra and Scorpio.[1]) (Fig. 3, 4.)

The spear throwers of the Borgian and Dresden codices represent the opposite zodiacal signs from Capricornus to Gemini inclusive, hurling their weapons from the meridian at the signs below, or perhaps the rising signs in the east »slaying« or driving below the horizon their catasteric setting signs in the west. *Seler*

[1]) The symbols referred to are found on the following pages of the Codices: Borgiano 62, 61; Dresden 46—50; Cospiano (Bologna) 9—11; Vaticanus 3773. 17—13. In the Dresden Codex the symbols occur in direct sequence, in the Borgiano in invented sequence; in the other codices there are slight variations in the sequence.

Fig. 2. Zodiacal symbols of the Codices: The spear throwers of Capricornus-Gemini. (After *Seler*.)

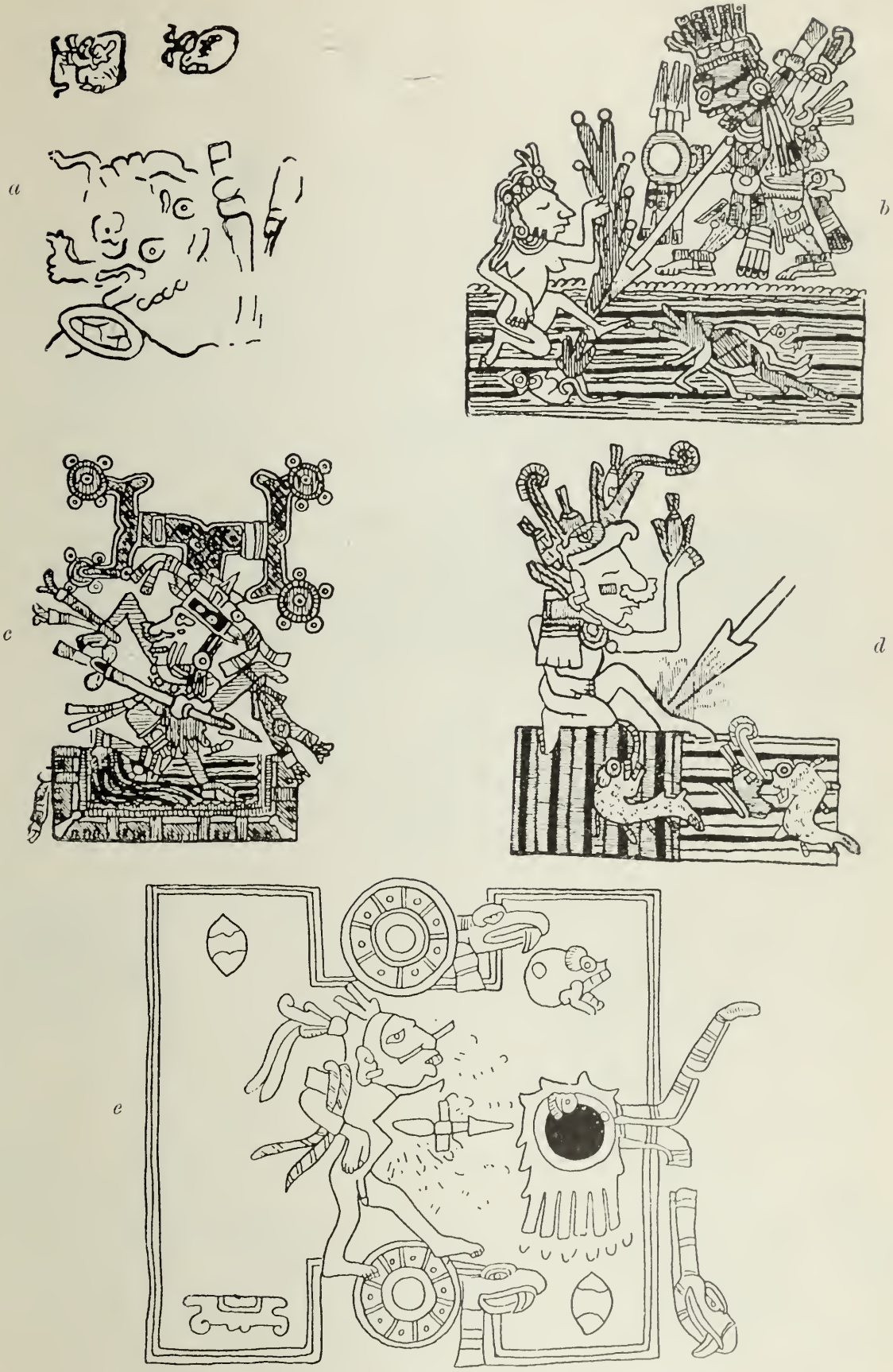

Fig. 3. Zodiacal symbols of the Codices: Cancer, Leo, Virgo. (After *Seler.*)

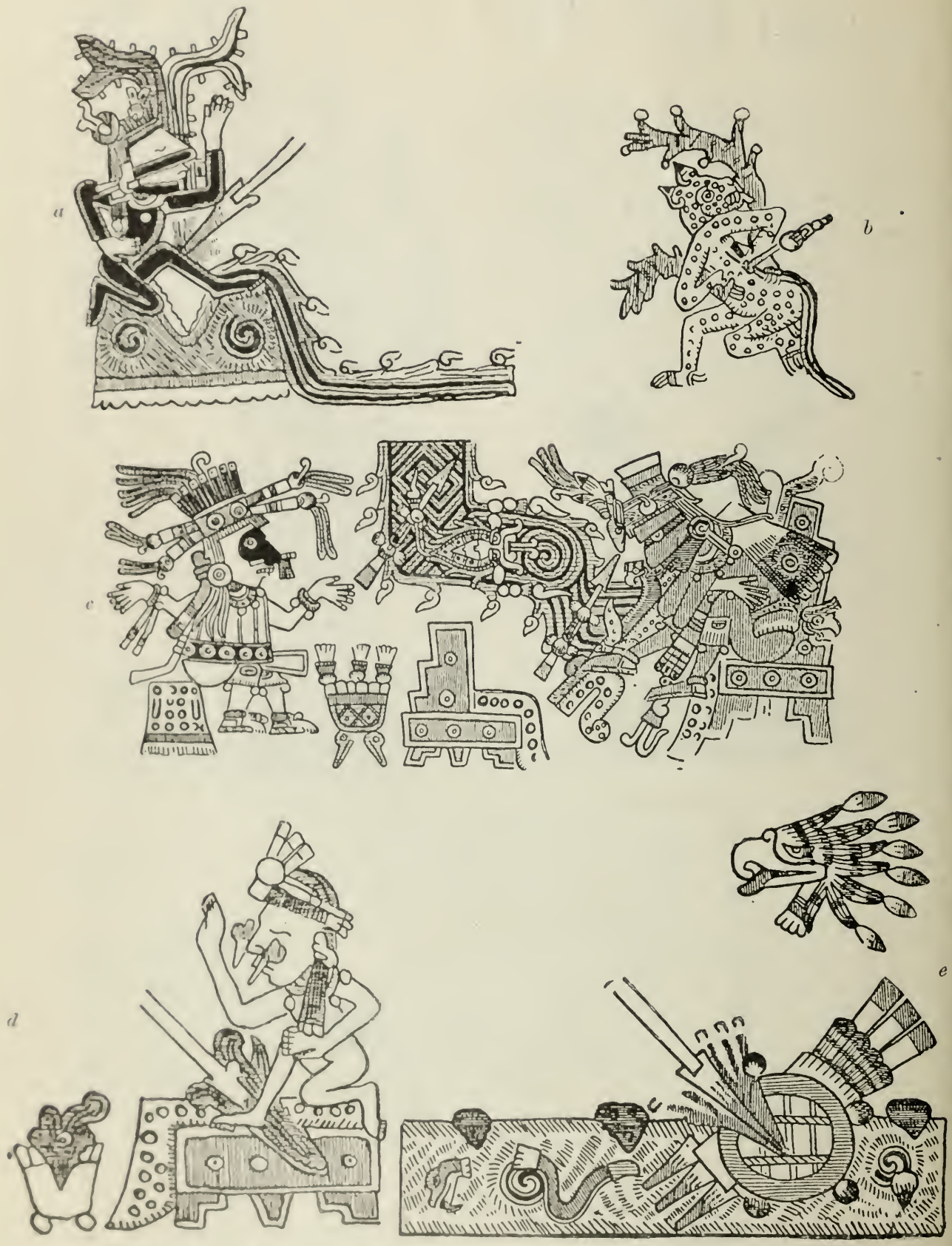

Fig. 4. Zodiacal symbols of the Codices: Leo-Sagittarius. (After *Seler*.)

admits that the spear throwers »were allotted to the quarter just opposite to that where lives the demon at whom they throw the spear«.[1]) The spear throwers follow the same order as the objects struck (Fig. 2).

To the zodiacal symbols already mentioned must be added the deities of the Codices, well described by Dr. *Schellhas* in his paper on the Representation of Deities in the Mayan Manuscripts, translated and republished in Vol. 4, No. 1 of the Papers of the Peabody-Museum of Harvard-University. Many of these deities are rulers of the zodiacal signs. The names and hieroglyphs of the day and month signs furnish further zodiacal symbols, though the calendric relations of the former are not yet entirely clear. The Mayan sacred city of Izamal in Yucatan was originally surrounded by twelve pyramid temples, each of which, represented one of the signs in its proper relative position in the zodiacal circle. This plan reflected on earth the supposed celestial design in the same manner as the plan of the Inca capital, Cuzco, which the writer had the honor to describe at the New York meeting of this Congress. The names and attributes of these signs are given by *Lizana*.[2]) Finally, the names and ritual of the monthly festivals of the Mayas and Mexicans also add to our zodiacal knowledge for, as in so many times and places, the motive of these festivals was the imitation upon earth of the attributes of the sign through which the sun was passing at the time they were held.[3])

The only previous researches upon these zodiacs with which the writer is acquainted are those of *Humboldt* in his »Vues des Cordillères«. The inspiration of his genius opened for others a path into a previously unexplored region, but the present writer is indebted to later students for explanations of the material which he uses. He has presented the subject in greater detail in a forthcoming work upon Peruvian and Mexican Astronomy.

In the Borgiano Codex, Aries and Taurus are represented together in the fifth group as a spear thrower with the head of a rabbit. This and the corresponding Dresden symbol must represent both signs because opposed to symbols which unquestionably re-

[1]) Ibidem, p. 670.

[2]) See Author's paper on the celestial Plan of Izamal, to be published.

[3]) The details of the Mayan ritual may be found in *Landa*, Relacion de las Cosas de Yucatan. *Brasseur* ed., p. 240—311. A summary of the Mexican ritual is given in the second and third volumes of *Bancroft*'s Native Races of the Pacific States.

present both Libra and Scorpio. The rabbit perhaps indicates the asterism of the pulque and harvest gods, the Centzon Totochtin or four hundred rabbits. *Brasseur* identifies them with the Omuch Quaholab or Four hundred young men of the Popol Vuh, who became the Pleiades.[1]) In the Dresden Codex the corresponding position is occupied by a god with bound eyes associated with the downward direction (Fig. 2 *g*). *Seler* inclines to see in this symbol a Tzontemoc, one of a group of stars whose fall from heaven with the lord of the death was commemorated in the Quecholli festival opposite Taurus.[2]) These stars are probably Taurid meteors which emanate from Taurus in greatest numbers when the sun is in Scorpio, the death sign.[3]) Their headlong flight would naturally suggest the death and destruction of the world. The Mayan uinal or twenty day period Mac to shut or close, pertains to the period when the sun is passing through Aries. The God Xipe, the Flayed One, whose festival was celebrated under this sign by the Mexicans, sometimes is drawn with closed eye in the *Humboldt* picture writings.[4]) The ritual was marked by the flaying of human victims by the priests who donned their skins. *Seler* regards this as symbolizing the renewal of the earth in springtime, of its assuming a new covering, a new skin.[5]) But this feature, as well as the symbolism of the rabbit, also emphasizes the idea of vicarious sacrifice. So does the corresponding Maya ritual, the principal sacrifice of animals. The purpose of the latter was to bring the rains.

Although the stag or deer, Mazatl, is certainly asssociated with Pisces in the Codices, it seems hardly less certain that it is also a Taurus symbol. On page 63 of the Borgiano Codex, in a position immediately preceding the Cancer symbols, a deer is struck by a spear hurled by the death's head god of Scorpio. As Scorpio is opposite Taurus this locates the deer in the latter sign. The two-headed deer which fell from heaven and was used to bring success in war may be a variant. Similar figures are found on page 13 of the Borgiano Codex and on page 20 of Vaticanus 3773. The constellation Chief of the Stags mentioned in the Popol Vuh

[1]) Popol Vuh. *Brasseur* ed., p. 52.
[2]) Exp. Cod. Tell.-Rem.
[3]) Cf. *Haliburton*, The Pygmies of North Africa and Spain, p. 145—147.
[4]) Cf. *Seler*, p. 132.
[5]) Proc Int. Congr. of Americanists, 13th Session, p. 172.

must also be identified with Taurus. Manik, the Mayan day sign meaning deer, is symbolized by a hand giving the gesture of an invitation to eat, because the deer was meat to be eaten.[1]) The two Mayan uinals Kankin, maize sun, and Moan, the storm bird, pertaining to this sign, thus echoing the worldwide association of the Pleiades and Taurus with the crops and the rains Moan, the Pleiades symbol, may be composed of a bird's head and deer's body (Fig. 2 *c*). In both uinals there were rites in honor of the gods of the fields and crops. The Aztecs in their corresponding third festival, Tozoztontli honored Centeotl as god of crops, food and flowers, and in their fourth festival, Huey Tozoztli, a procession of virgins carried maize ears to the temple and the body of a human victim was placed in the maize granary to ensure a good harvest.

In the Borgiano Codex the position of the Gemini symbol is occupied by a figure wearing a white death's head, a Scorpio symbol which may here denote Gemini as a catasterism. In the fifth group of the Dresden Codex the spear thrower who seems to represent Gemini is a figure with warrior's head ornaments whose head is surrounded by bird and serpent symbols (Fig. 2 *e*). Above him are two quarrelling deities. His hieroglyph includes a head with bleeding, empty eye sockets, the special sign of the Mexican deity Xolotl, servant or page, also dog (Fig. 2 *f*). He is brother of the Bird-Serpent Quetzalcoatl, whose name is also translated Divine Twin, and before whose mouth the serpent symbol is sometimes similarly placed.[2]) Possibly the figure combines the attributes of both. The two together probably symbolize the dual contrasted principles of nature. Both Quetzalcoatl and his Mayan analogue Kukulcan are heroes of an origin legend containing the usual elements of the Gemini legends as indicated by *Lenormant*, the cave birth, brothers, fratricide, journey and founding of a city. At Cholula, the capital of his cult, the festival in his honor was held during the Toxcatl period under Gemini. The creation of mankind is attributed to both Quetzalcoatl and Xolotl. Both may probably be identified with the Chicchan serpent deity, god H of the Mayas, whose hieroglyph contains a dog's head and seems to hold the lightning.[3])

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[1]) *Seler*, p. 30.

[2]) *Seler*, 389, 9, 308.

[3]) *Förstemann*, Commentary on the Maya Mss. of Dresden. Papers of the Peabody-Museum of Harvard. Vol. IV, N°. 2, p. 65.

As lord of the dawn Quetzalcoatl is associated with the morning star and, as lord of the divine breath, he rules the day sign Ehecatl, Maya Ik. The Mexican high priests bore his name. *Bancroft* correctly sumises that his mythical conflict and alternate rule with Tezcatlipoca denote the two contrasted seasons of the year, the one propitious, the other adverse. In fact the myths and ritual show that Quetzalcoatl rules the signs from Gemini to Sagittarius and Tezcatlipoca those from Sagittarius to Gemini. In the uinal Pax, to break or bruise, under the latter sign, the Mayas celebrated the festival of their two generals, one of whom was chosen, probably at this time, every third year. Pax may also be translated a musical instrument, perhaps a drum. The following uinal is Kayab, song. Toxcatl is the corresponding Aztec festival dedicated to the brother gods, Tezcatlipoca and Huitzilopochtli, the latter of whom led them upon their mythical journey from the place of origin.

Cancer is the first of the six signs drawn by *Sahagun* and described by him and *Tezozomoc*. It is figured as two sticks meeting at an acute angle, and is called Mamalhuaztli, the sticks or drill with which fire was kindled (Fig. 1 *a*). These sticks also appear beside the fire and water God K, who is the first of the objects struck by spears in the Dresden Codex [1]) (Fig. 3 *a*). Two tongues of flame project from his head and from his nose the object, possibly a tapir's trunk, which characterizes a prominent deity often figured on the facade of Mayan temples.

We seem also to see the five sticks under the black spear thrower of Capricorn, the opposite sign (Fig. 2 *a*). They are peculiarly appropriate symbols of the burning heat of the June solstice and of the Mayan festival of the renewal of fire which was held as the sun was passing out of Cancer into Leo. The symbolism of the new fire appears in both the corresponding signs of the Mayas and Mexicans.

A figure similar to that given by *Sahagun* may be seen in the few bright stars of Cancer. *Tezozomoc* gives as additional names of the asterism Youal Itqui, Bringer of the Night and the Keys of Saint Peter. *Sahagun* describes it as the wands (mastelejos), a greatly revered constellation not far from the Pleiades. It

[1]) Cf. *Seler*, ibidem, p. 376.

was honored with various ceremonies when it appeared in the east ending the feast of the sun. After offering incense to it the Mexicans said »Now Youal Tecutli and Yacaviztli, the Lord of the Night and the Pointed Staff is come. How will the night end? How will the morning dawn?« Three times they offered incense to this asterism at nightfall, at three in the morning and at dawn, and they burned the wrists of men in honor of these stars because he whom they regarded unfavorably would be compelled after death to produce fire from his wrists in the same manner as from fire sticks. It will be noticed that the constellations referred to rise at sunset and set at sunrise. In Mexico Cancer fulfills these conditions in February. During that month the Aztecs ended and began their ritual year, at the end of the Izcalli festival in honor of the sun and Xiutecutli, god of fire. At this time the new fire was produced at midnight by boring rapidly by hand one stick upon another. [1]) Hence probably the bringer and lord of the night, ending the feast of the sun, hence also the leading position of Cancer amongst the asterisms. The ritual implies a reference to a zodiacal asterism in opposition to the sun at the time, and this must be Cancer. In the Middle Ages the Keys of St. Peter were located in Aries but this name may refer to an older tradition of the Saint standing beside the ancient Heavens' Gate of Cancer. The sticks of wood happen to be a Spanish name of Gemini but have no connection with the Mexican constellation. *Sahagun* perhaps confuses the two, although »near the Pleiades« is a comparative, indefinite expression which does not necessarily exclude the stars of Cancer. The painted staff may refer to the ceremonial fire sticks.

In the Borgiano Codex the first object struck by the spear is the water goddess Chalchiuhtlicue who stands in the water beside a crab and other aquatic forms (Fig. 3 *b*). She appears also in the Cospiano (Fig. 3 *c*) and the Vaticanus 3773 with symbols of the emerald Chalchiuitl. God K is also associated with the sacred emerald or jade of Nuundecu, the god of health, and with the deity Toh of the Popol Vuh, who first produced fire. [2])

The tortoise is the recognized symbol of the June solstice. It is pictured with a head resembling that of the ara and holds an

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[1]) *Sahagun*, tom I, lib. II. — *Bancroft*, III, 390.

[2]) *Seler*, ibidem, 292—293.

upright and inverted torch in either hand to signify the northward and southward course of the sun meeting at this time.

At Izamal Cancer is called Kinich Kakmo the Suneye and the Ara of Fire, from the solar rays and a group of stars which were supposed to descend at noon upon an altar, as an ara with fiery plumage descends in its flight. In the Codices the ara is often reproduced beside the water goddess. This supposed descent was a feature of the Mayan ritual of the supplementary days under Cancer. The Mexican festival Cohuailhuitl, flower or flame upon an altar corresponds in time, likewise the Aztec festival Etzalqualiztli in honor of the Tlalloc or rain gods and the goddess of salt.

The second asterism named by *Tezozomoc* is Citlaltlachtli, Ball-ground Asterism. *Sahagun* shows this as a rectangular figure similar to the ball courts found in various Mexican and Yucatec ruins, in which the favorite game of Talchtli, Maya Quiche Hom, was played (Fig. 1 *b*). The outlines of the figure are closely approximated by the stars $\alpha. \gamma. \Theta. \chi.$ Leonis with η and a nebula adjacent to it, perhaps representing the two stone rings though not in the proper position. The two lines of five stars each, within the court seem to be purely imaginary.

A number of representations of this ball court appear in the Codices amongst other astronomical signs. One on page 18 of the Borgiano Codex represents a deity sacrificed on a court upon which the red and black Tezcatlipoca are at play [1]) (Fig. 3 *e*). Tezcatlipoca was god of the mystic smoking mirror with which the new fire was ceremonially lighted at the junction of the signs Cancer and Leo. As the representative of the solsticial sun, seats were placed around the streets to offer repose to him. In the pictograph the victim is placed between two rings, the figures on which suggest the Mayan symbol of the ahau katun or fifty-two year period. The symbol itself was called uazlazon katun, the war or game of the katuns.[2]) *Brinton* and others have shown the probable association of the game with the solar journey, the ball representing the sun. The Borgiano pictograph indicates its association with the astronomical ritual. As we shall find Tezcatlipoca and the game also connected with the sign Sagittarius the ritual of which included the initiation of knights, it is possible that the two rows of stars

[1]) *Seler*, ibidem, 319

[2]) *Landa*, 313.

represent the two rows of tecuhtli or knights drawn upon opposite sides of the ball court to recrive a novice.[1]) The ball court itself was primarily a temple consecreted by mystic rites.[2])

Tezozomoc, however, calls this constellation »the North and its Wheel«, a name of »Ursa Major« who came down to water because he is Tezcatlipoca and was on high in memory of him.«[3]) In other words Tezcatlipoca in tiger form rules the asterism Ursa Major, called the Wheel, because of its circular revolution around the northern pole. A circular figure similar to a wheel in appearance was carried by the Mayan god of war. Ursa Major lies directly between the pole and Leo and may have been regarded as the residence whence Tezcatlipoca governed the latter constellation. At any rate the confusion of the two asterisms by *Tezozomoc* is doubtless due to their close relationship and common ruler.

In the Borgiano Codex Leo is represented by Tezcatlipoca struck by the spear (Fig. 4 *a*), in all the other Codices by a jaguar as a symbol of the same deity (Fig. 4 *b*), hence the sculptured jaguar in the temple beside the Ball-court of Chichen Itza and the procession of tigers alternating with balls, upon the walls of the court, hence also the mural painting of the battle scene within the temple, appropriate to Tezcatlipoca as god of war.[4]) A well known myth describes how this god having descended from the sky on a spider's web to contend against Quetzalcoatl at ball, transformed himself into a jaguar during the game. The Mayan festival of hunters and fishermen described under the uinal Zip seems to pertain to Leo as does the Mexican warrior's festival Tecuilhuitontli.

In the position of Virgo *Tezozomoc* and *Sahagun* place an oval figure surrounding a mass of stars, the whole being called Tianquiztli, the Market Place (Fig. 1 *c*). This is said to be a name of the Pleiades, but the figure does not resemble that group. Its outlines reproduce fairly well those formed by the stars of Virgo surrounding Spica 86, 83, m, l, 66, Θ. Ψ, 53, 69, 75. The confusion of the Pleiades with Virgo may be due to confusion of similar attributes, for both asterisms govern the crops.

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[1]) See: *Veytia*, T. 1, cap. IX. — *Charnay*, Anc. Cit. of New World, p. 113.

[2]) *Brasseur* in Popol Vuh, p. 70, note.

[3]) Codex Ramirez, *Henry Philipps Jr.* in Proc. Am. Phil. Soc., vol. XXI, p. 620.

[4]) *Holmes*, Ruined Cities of Mexico, 128; — *Charnay*, Ancient Cities of the New World, 360–363.

Charnay considers it probable that the low and somewhat irregular pillars of the Halls of the Columns at Chichen Itza were supports of a market place.[1]) If so the irregularly grouped stars within this asterism may have a similar meaning.

Both the name and symbol of the market place asterism are appropriated to Centeotl, the Maize Deity, God E of the Codices, whom, in feminini form, as the general mother goddess and deity of production, we next see struck by the spear in all the Codices (Fig. 3 *d*).[2]) The Tianquiztli symbol seems to be repeated in one of the new hieroglyphs (Troano, pag. 29 *b*) with a maize plant sprouting from it. The fishes below the deity probably represent the opposite sign Pisces. Catasterically the figure corresponds to that of Ilamatecutli, an aged goddess engaged in weaving or other female occupation, whom the Aztecs honored in the Tititl festival. In the Codices the symbols of certain signs are sometimes repeated in the opposite sign, associated with youth in summer, age in winter.

God E is also represented in the position of a woman in labor and once holds a vase, probably for grain, in his hands. He is associated with the Virgo uinal Uo or Frog, and sometimes wears a cruciform head ornament. Ciuacoatl, snake woman, mother of the contending twins, another form of the celestial goddess, is said to have carried a cradle which she sets down in the market place.

At Izamal, though direct tradition is silent, Virgo was probably represented by the temple of Ixchel, the patroness of the vestals, the Mayan form of the mother goddess. The ritual in her honor was celebrated during the Virgo uinal Zip, tree, fault or error. Men and women participated in the rites apparently with phallic incidents. Both the Mayan and Mexican Virgo ritual included rites in honor of a great tree which probably signifies the Southern Cross directly south of Virgo. The preceding uinal Uo or Frog, ruled by the Frog God of Pisces has certain associations with the Virgo symbol of fertility and production.

The Hueytecuihuitl, the Aztec festival of this sign consisted of rites in honor of Centeotl as Mother of the Maize, and Xilonen as goddess of the young maize. This festival inaugurated the eating of maize. Phallic rites seem also to have been included.

[1]) Ibidem, 368.

[2]) Cf. Mrs. *Nuttall*, Fundamental Principles of New and Old World Civilization, p. 93.

The distribution of flowers took place during the following festival, Tlaxochimaco, also accompanied by phallic rites. The festival of Centeotl as Mother Goddess—called the Ochpaniztli or Broom festival, though described under Libra, clearly pertains to this sign.

In the ceremony called Farewell to the Market Place, the woman who represented the Mother Goddess was sacrificed after being conducted ceremonially around the market place, scattering maize about her as she walked. Women acted the part of men. The scattering of these various ritual features pertaining to the signs was doubtless due to the divergence between the calendar and the true solar year.

Sahagun figures Libra-Scorpio as a scorpion, its claws extending over Libra as in the earlier Greek zodiacs (Fig. 1 *d*). He says that, in some places, these stars were called the wagon, but the Mexicans called them the scorpion because they have the figure of that insect, and they are so called in many parts of the world. *Tezozomoc* refers to the asterism as the Scorpion, forming the Colotl-ixayac or Scorpion-face, which typifies the four quarters of the earth governed by the heavens. Both writers clearly identify the asterism with Scorpio, and it will be noted that its occurrence in the proper relative position to represent Libra and Scorpio adds to the probability of the preceding identifications. The four quarters seem to allude to Scorpio as one of the four principal signs which once governed the equinoxes and solstices. The stars belonging to this asterism are sufficiently indicated by the figure, and are almost all the same as those of our two signs.

In the position of these two signs in the spear throwers group of the Borgiano Codex a carved wooden seat covered with a jaguar skin is struck by the spear thrown by the rabbitheaded deity of Aries-Taurus. Upon it sits a human figure with his right hand upraised as if announcing the decrees of the celestial powers, which he beholds in the flames burning in the braziers before him (Fig. 4 *d*). On another page of this Codex, and in Vaticanus 3773 a similar seated figure, having before him a brazier and the seat of a tlahtouani, gazes at a scorpion immersed in a stream of water, possibly the Milky Way. Two spears, one before, one behind the insect, possibly indicate its two signs (Fig. 4 *c*). In Vaticanus 3773 a mat appears over the skin on the throne and the human figure placed above these objects has the symbol of speech before his mouth. In the

Cospiano Codex the sun is substituted on the throne in place of the human figure and a series of dots, by chance or otherwise, follow rather accurately the alignment of the stars of the Libra-Scorpio asterism. In the Dresden Codex a recumbent human figure with an animal head is struck. As *Seler* points out, seat, jaguar skin and mat are badges of exalted rank, and the symbol of speech indicates a tlahtouani or speaker. The asterism may doubtless be identified with that called Teoyaotlatohua and represented by the half of a human body seated on a bench with mouth open as if speaking. His arms were like trunks of trees with branches. This constellation was associated with rites in honor of the dead kings and lords in the month Hueymiccailhuitl; the Tlascalan feast of the dead under Libra.[1]) The high priest of Mitla, Place of the Dead, sat upon just such a throne, with jaguar skin and mat, when he administered justice and declared the knowledge which he was supposed to acquire from intercourse with the spirits of the dead. He was called Uija-tao, he who sees all things. The pictographs therefore refer to the tlahtouani or priest-oracle, the Mayan chilan, who announces the wisdom obtained from the dead. Sometimes this priest is pictured beside a mummy bundle and bears its name.[2]) This symbolism compels us to view the death God A of the Codices as the ruler of these signs. He is figured as a skeleton spine and skull with the owl which sees in the darkness, and two cross bones as his symbols, sometimes also as a scorpion according to Dr. *Fewkes*.[3]) His day sign cimi, dead, Aztec, miquiztli was frequently represented in opposition to Moan, the Pleiades symbol. The day sign malinalli also pertained to him — a death's head with protruding tongue, or a skull covered with a green bush. The bush represented the mummy bales tied with grass rope and probably included the idea of regeneration and life after death. Figured with the death's head, God A hurls the spear at the deer god of Taurus in the Borgiano Codex (p. 63). The scorpion is also figured in Vaticanus 3773 (p. 80) over an altar. Beneath it is a dark chamber which contains a naked human figure lying on his back in a position similar to the Dresden pictograph of this sign. On the left a green plant with blossoms is growing under the night sky, sug-

[1]) *Bancroft*, II, 399, 400.
[2]) *Seler*, ibidem, 148.
[3]) God D, 219.

gesting the Mayan uinal Yaxkin, Green Tree Sun. The whole may represent the association between the scorpion, tomb, death and life after death.

At Izamal Libra becomes Papp Hol Chac, the House of Heads and Lightings, where dwelt the priests who declared the oracles, Scorpio is Cabul, the Working Hand, a temple erected to Ytzamna as lord of the dead, so called because that deity brought the dead to life by laying his hands upon them. He was also an oracle who foretold future events.

The uinal Tzoz, bat, pertains to Libra, hence we must connect with this sign the bat deity who devours the light, ruler of the subterranean cavern into which the sun sinks at setting. [1])

This is a fit symbol of the autumnal equinox when darkness prevails over light. His hieroglyph refers to his mat or his royal seat. The following uinal Tzec, discoure or foundation, would seem to refer to the festival in honor of Ytzamna as the first priest, the principal feature of which was the delivery of prognostics by the most learned priest, although this ceremony is described under the uinal Zip. The death of Kukulcan and his ascent to the sky were celebrated under the Scorpio uinal Xul or end. On the last day, dominated by the symbol of the death God, he was believed to descend to receive the offerings, probably accompanied by the spirits of the dead and coming over the Milky Way. The »end« may refer to this death sign as the end of life, and to the termination of the rule of Kukulcan upon earth. The following uinal, yaxkin, green tree sun, as previously stated, is associated with symbolism representing rebirth and renewal. It is also the fire tree, probably the sacred yaxche tree, called the tree of life, under whose cool, umbrageous shade the souls of the dead were supposed to rest in the land of the hereafter. [2])

The tenth Aztec festival, Xocotlhuetzi, under Libra was concerned with the rites of the god of fire. The twelfth festival, Teotleco, the god has arrived, under Scorpio, honored all the deities but especially Tezcatlipoca. A mat sprinkled with flour was placed at the threshold of his temple and a priest was set to watch for foot prints thereon which would indicate his arrival. Slaves were sacrificed by two young men one representing the

[1]) *Fewkes*, God D, 209—210. — *Seler*, ibidem, 240.

[2]) *Seler*, 30. — *Landa*, 201.

bat god. Their bodies were afterwards carried to the wards whence they had set out alive)

In the position of Sagittarius *Sahagun* exhibits a figure resembling a dipper in outline, and composed of seven stars, which correspond quite accurately in position with the group in Sagittarius, popularly called the Milk Dipper (Fig. 1 *e*). This consists of the stars λ. γ. δ. φ. σ. τ. and ζ. *Tezozomoc* says that the Mexican ruler, after observing at midnight the preceding four constellations, which we have identified with the signs from Cancer to Scorpio inclusive, was further admonished to observe carefully, later on, towards morning, the asterism Xonecuilli, which is the property (encomienda) of Saint Jacob, and which is situated in the southern sky towards India and China. In the latitude of Mexico and during the month of May, when the observation took place, the above mentioned stars of Sagittarius would rise in the south east soon after midnight. but could not be clearly seen until somewhat later. The encomienda of Saint Jacob probably refers to the Milky Way popularly known to the Spanish as »el camino de Santiago«, the road of Saint Jacob, so that the text seems to refer to the stars of Xonecuilli located in the Milky Way towards the south.. This is a correct description of the position of the Xonecuilli group of Sagittarius. *Sahagun* adds that the Mexicans call Xonecuilli the stars which are in the mouth of the trumpet and they are eaten in all houses on one day of the year which they call Xuchilhuitl.

In the fourteenth Aztec festival called Quecholli and celebrated under Sagittarius, young men summoned to the temple to be initiated blew upon conch shells and trumpets. The Xonecuilli volute itself has the form of a spiral shell. In the Milky Way besides the stars of Xonecuilli there is a bright spot which presents the form of a trumpet with its mouth towards the group, and again the dark portion of the Milky Way to the north of Sagittarius assumes a like form. One of these asterisms may be associated with the name and the ritual. Ursa Minor, the Spanish trumpet asterism probably has no connection with Xonecuilli, but its markedly similar form may have led to the confusion of the two. The Xonecuilli which were annually eaten were S shaped cakes, the form of which evidently symbolized the asterism, as Mrs. *Nuttall* has pointed out.

) *Bancroft*, II, 333, 334.

The Xochilhuitl, or Flower Festival of which the God Macuil Xochitl or Five Flower was one of the principal patrons, was held on different dates in different parts of Mexico, but all under Sagittarius. Macuil Xochitl was the god of games and revelry but especially of the ball game. His image was placed upon every ball court. [1])

The Codex Nuttall also records that a peculiar recurved weapon figured in the hands of deities was called Xonequitl. It was an appropriate symbol of this sign governed by Mixcoatl, the cloud serpent of the Milky Way, a form of Tezcatlipoca as the god of hunting and warfare, God F of the Codices. The symbol may also be identified with Mixcoatl's magic staff amimicli, which has a similar form. [2]) The facts stated seem to indicate that the radical meaning of the name Xonecuilli was probably the double S shaped curve.

The Sagittarius symbols of the spear throwers group are, in the Borgiano Codex a shield and bundle of spears, symbols of Mixcoatl and the war gods, F, Huitzilopochtli and Tezcatlipoca. Beside them are volutes having the form of an animal's tail, also that of the Xonecuilli symbol; above them is the head of an eagle, symbol of the warriors (Fig. 4 *e*). The same volutes are figured in Leo under Tezcatlipoca who is represented by the jaguar (Fig. 4 *a*). In the Dresden Codex the corresponding symbol is a warrior, in the Cospiano and Vaticanus 3773 a mountain. In the latter Codex the mountain is surmounted by an eagle. In one type of this sacred mountain the summit terminates in a volute which again recalls the Xonecuilli symbol.

The Izamal pyramid of Hunpictok, the general in command of eight thousand lances, answers to Sagittarius in position. Arms were kept there. Two gigantic human heads and a crouching human figure have been found upon its various sides, the former probably pertaining to the two generals or gods of war. *Charnay* also mentions a crouching tiger which no one else has seen. On both sides of one of these heads there is a space filled with double curved Xonecuilli symbols. Similar symbols are repeated beside the human

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[1]) *Seler*, Codex Vaticanus, 3773, p. 311, 186—190. — Mrs. *Nuttall*, Fundamental Principles, 34.

[2]) *Henry Phillips Jr.*, ibidem. — *Seler*, ibidem, 363, 368, 670.

figure, which is evidently that of a victim about to be sacrificed, and indeed, the figure itself assumes the form of the symbol. [1])

In the Mayan ritual the uinal Mool, claw or paw, pertains to this sign. The symbolism leads us to suspect that this name, as well as the Xonecuilli symbol may have been derived originally from the curved tail of the ocelotl, mool being also the Mayan name of that animal. In the Mexican ritual the human victim who represented the God Mitl, the Arrow was sacrificed at this time. Thoug this sacrifice is described as taking place only at Quauhtitlan every fourth year, it was probably general and annual in more ancient times. The following description of a Mayan sacrifice probably refers to a similar rite: Those who conducted the victim danced around him armed with bows and arrows after which he ascended the steps of the temple, was laid upon a stone at the summit and was shot with arrows discharged ad his heart by the dancers. The Nacon, one of the generals, then tore out his heart, and his body was thrown down the steps, thus symbolizing the northward and southward course of the sun, as in one of the Mexican rites. During this uinal boys and girls were initiated probably on attaining puberty, the girls by a woman called Ixmol, the Conductress. [2]) The Mexican ritual included the Tepeilhuitl festival of the mountains, the initiation, ceremonial making of arrows and ceremonial hunt in honor of Mixcoatl in the Quecholli festival and the rites in honor of Huitzilopochtli as god of war in the Panquetzaliztli. The festival of the jaguar, seems also to have formed part of the Quecholli ritual.

In the calendric symbols of the Codices Sagittarius sometimes appears to be represented by Tezcatlipoca as the jaguar god, with the bundle of javelins and other symbols of war, opposed to Quetzalcoatl in Gemini. [3]) Tezcatlipoca and the ball court are evidently associated with this sign as well as with Leo, for the god who is being sacrificed on the ball ground in the Borgiano Codex bears the symbols of Mixcoatl, god of the Quecholli festival, and the black Tezcatlipoca carries the flag symbol of the Panquetzaliztli rites. Moreover Macuil-Xochitl is evidently closely related

[1]) See illustrations in *Holmes*, Ancient Cities of Mexico, 399. — *Charnay*, Ancient Cities of the New World, 311. — *Le Plongeon*, Queen Moo, 197.

[2]) *Landa*, 167—169, 303—305.

[3]) *Seler*, 290.

to him. Probably the myth of the descent of Tezcatlipoca from the sky, his contest with Quetzalcoatl at ball, and his victory over the latter, referred to his annual victory in Sagittarius, previously mentioned under Gemini.

In the spear throwers group of the various Codices Capricornus is represented by the first of the spear throwers. In the Dresden Codex this is the black God L who wears a beardlike appendage, and kneels upon two objects having the form of the fire sticks (Fig. 2 *a*). Above the spear throwers appears a being with an animal's face who holds a jar filled with water. This suggests the uinal Chen or Reservoir under this sign. The beard symbolizes the solar rays called u mex kin, beard of the sun, whence perhaps the Ymix sign, one of L's symbols.[1]) The beard is also associated with god D, the aged black deity of darkness and nigth, in whom may be seen the feeble, aged sun of the December solstice. He is opposed to the young and vigorous sun of the June solstice and typifies winter, the night of the year. The snail, symbol of the December solstice sometimes appears upon his head. In the Troano he is placed beside a being who is apparently sculpturing a human head with a knife. This probably refers to the ceremonial making of images of the black gods in the uinal Chen. By nearly all writers God D is identified with Itzamna. His symbols include ahau, lord, and akbal, darkness. The Nahuatl equivalent of the latter is calli, house, probably the zodiac as the sun house entered in the dark season of winter.[2]) The Mayas seem to have begun their year in Chen, with the festival Ocna, Entrance into the house.[3])

At Izamal the temple of Capricornus was dedicated to the Cosmic Spirit, Ytzamna. In the Mexican ritual of the sign the image of a great serpent was carried in procession. Tezcatlipoca may also have been honored a this time as god of the solstice for whose repose chairs were placed on the street.

The Aquarius spear thrower of the Borgiano Codex has the head of a vulture, the storm bird. In the Dresden Codex he becomes the red rain-god Chac whose body exhibits the vertebrae and ribs of a skeleton. A curved string of precious stones

[1]) *Seler*, 659.

[2]) Cf. *Fewkes*, 209.

[3]) *Seler*, 22.

hangs over in front from his head dress, perhaps denoting drops of rain (Fig. 2 *b*). Above him is seated a deity holding a water jar; below him is a parrot head probably Cancer as a catasterism. He represents water as a destructive element, floods and storms.

The goddess I must be viewed as the female companion of the Aquarius raingod. She pours water from an inverted jar, while over her head a serpent seems to discharge water from its mouth. Her body, like his, is painted red, or reddish brown,

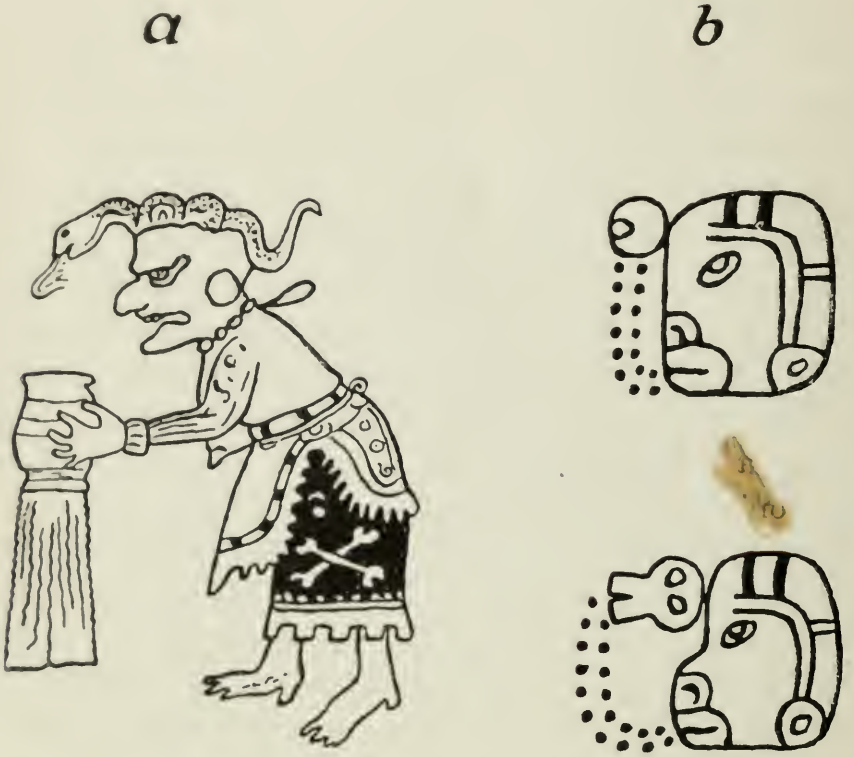

Fig. 5. Goddess I and God C, deities of Aquarius and Pisces.

and the skeletal ribs and vertebrae appear upon it. Cross bones are added upon her skirt and the signs for evil days frequently occur with her (Fig. 5 *a*). Such is the meaning of the Aztec twenty-day period, Tititl under Aquarius. In Yax, the uinal of this sign, the Mayas honored the rain god Chac and there were purificational rites in the temples. The Aztecs likewise honored the rain gods in the corresponding period Atemoztli.

The spear thrower of Pisces is figured in the Borgiano and Dresden Codices as a deity with a deers head, corresponding to the uinal Ceh or Deer (Fig. 2 *d*). The sign may also be denoted

by the fishes placed under Virgo (Fig. 3 *d*) and by the Gods C, N and P. The ape god C is also associated with the pole and with celestial revolution, perhaps denoting as a catasterism Ursa Major, the wheel of the north, and the stars of Ursa Minor with $\varkappa$ and λ Draconis figured as an ape attached to the north pole by its tail and swinging around it.

In the Troano Codex an inverted water jar is placed before the face of God C and two dotted lines which extend from the jar to his mouth may siginify water flowing from the jar of the Aquarius goddess[1]) (Fig. 5 *b*). This, needless to say, duplicates the zodiacal figures of Aquarius and Piscis Australis. A fish-tail symbol may be observed projecting from the back of the deer head deity and over the heads of gods C and N. The last named is an old man who governs the uinal Zac or White. P, the Frog God, may govern catasterically the uinal Uo or Frog. He is drawn upon a blue background symbolizing water and holds in his hands the planting stick with which he is making furrows in the ground and sowing seed — the renewal of agriculture after the rains. This idea seems also to be expressed in the name of the uinal Yax, green or first. In the Aztec water festival of the Tlaloc the priests flung themselves into a pond imitating the action and sound of frogs.

The Mayan ritual of the renovation of images and temples, described by *Landa* under Yax, probably belongs under this sign. Simirlarly we must probably transpose into the following uinal of Ceh, the Deer, the rites of Zac, to appease the anger of the deities of the game against the people and their crops. At the ploughing and sowing season the Mexicans dressed an ear of maize in a deer skin and placed it in the fields to watch over their crops. The Izcalli festival of fire was held at this time because the trees became warm and began to bud. It included the Pilquixtia or rites of renovation after which the life of all beings was renewed and the bodies of men became like those of children.

The correspondence between Mayan and Nahuan symbols mentioned in this paper amounts to practical identity in many instances, thus emphasizing the relationship which Dr. *Seler* was the first to suggest. Every sign in both zodiacs echoes the symbolism

[1]) Cf. *Schellhas*, D. M. C, 20.

of the corresponding Peruvian sign, as described in the writer's two papers in the Proceedings of this Congress (The Star Chart Salcamayhua, Paris 1900, and the Cuzco paper above mentioned, New York 1902) and the Peruvian Asterisms and their Relation to the Ritual read before this Congress (Stuttgart 1904) and published in the American Antiquarian and Oriental Journal, vol 26, pp. 329 etc.) and the three American zodiacs in turn combine with symbols peculiar to themselves, numerous others which indicate remarkable Oriental analogies. These analogies are too arbitrary to be satisfactorily explained as coincidences or as like results of like causes acting on the human mind. The group of the spear throwers is found in Codices all of which, according to Professor *Saville*, are regarded as having been completed prior to the first historic coming of Europeans. The symbols contained therein cannot therefore have been subject to post-Columbian influence, nor can such influence be reasonably supposed to have affected any of the other symbols referred to. It is, therefore, a legitimate question — one which, in different material, interested the genius of *Humboldt* — whether we must not consider that the correspondence between the astronomical symbolism of the two hemispheres indicates an interchange of ideas between them at some time and by some route as yet unknown, but before the discovery by *Columbus*. Beyond this the material indicates the pre-eminence and the complexity of the astronomical cult amongst the most advanced peoples of both the Americas.

The author earnestly hopes that this elucidation of the Mexican symbolic astronomy may help towards further identification of the Mayan and Mexican hieroglyphs of which, as yet, we know so little and from which we may hope to learn so much of ancient America.

The Maya Zodiac at Santa Rita

By

STANSBURY HAGAR, 1869–

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THE MAYA ZODIAC AT SANTA RITA, BRITISH HONDURAS

By Stansbury Hagar

Dr Thomas Gann has described a group of mounds, once numbering forty or fifty, situated on the estate of Santa Rita, near the village of Corozal in British Honduras.[1] Some of these mounds contained the remains of buildings that seem to have been purposely buried, possibly to preserve them from injury or destruction at the hands of the invading Spaniards. Far the most important is the mound numbered 1 by Dr Gann. This mound, situated almost at the northeast corner of the ruins, contained a rectangular building all four walls of which were originally covered with stucco paintings, but those on the south wall were completely destroyed and those on the other walls extensively injured before Dr Gann's excavations uncovered the walls as a whole. There is no reason to question that these walls were erected prior to the coming of the first conquistador and that the figures upon them are entirely free from European influence of that period. There were three layers of paintings upon them, but only the outermost could be reproduced. The north wall is much the best preserved. (Dr Gann's pls. XXIX, XXX; our pls. I and II.) The figures upon it are divided at the center by a doorway. Above the figures extends a border of butterflies used as solar symbols combined with stellar eye symbols and alternating arrowpoints or bone daggers representing rays of light.[2] A similar symbolic grouping is found at Mitla and at Acanceh [3] in Yucatan, and in both cases it indicates that the figures as a whole refer to the region of the sky and to the constellations lying along the solar path. This symbolism is continued by the rope of the ecliptic which extends through the middle band of the Santa Rita figures, and is found also at Mitla and in the Maya Codex Cortesianus. The hands of many of the human figures in the representation are tied to this rope; Dr Gann therefore regards them as captives. They are deities of the zodiacal asterisms, placed and maintained in their respective positions by the power of the Cosmic Deity, so that they move across the sky like a procession of captives bound to an invisible rope pulled by an invisible power. It is the eternal unchangeable procession of the stars revealing the omnipotent control of cosmic law, a spectacle which, once realized as it must have been by those who drew this representation, probably necessitated a higher conception of religion among the instructed few than any we have so far conceded to the American Indian.

A line of small circles or stars marks the lower boundary of the celestial zone, and a reddish-yellow band beneath it represents the earth; beneath this again a fish is swimming in the waters.

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[1] *Nineteenth Report Bureau of American Ethnology*, part. 2, pp. 641 et seq.

[2] Thus identified originally by Dr Seler.

[3] For Acanceh see Hagar in *American Anthropologist*, N. S., vol. 16, pp. 88 et seq.

The whole therefore seems to be a picture of the cosmos with the sky and the stars above, the earth below, and the waters under all, and in it are represented the four so-called elements, fire, earth, air, and water, which are conspicuous in the cosmic religion of America as in that of the eastern continent.

But we are concerned chiefly with the figures of the middle band, in which we may recognize another representation of the Maya zodiac, subjected, like the zodiacs of Mitla and Acanceh, to strong Mexican or Nahuatl influence. This zodiac is especially interesting because it combines and confirms, by the position of its symbols in the sequence, the author's identifications of the five zodiacal asterisms described by Tezozomoc and Sahagun, the ten zodiacal figures of the spear-throwers group in the Maya and Mexican codices, and the zodiacal symbolism of the Maya and Mexican day signs.[1]

As the paintings on the east half of the north wall are much better preserved than those on the west half, let us follow Dr Gann and study them first.

Beginning, then, at the right end of this half, next to the doorway, let us proceed toward the left, contrary to the numerical sequence adopted by Gann, but in accord with the actual position of the asterisms in the sky. We first observe a form suggesting the rattle of the snake and a bone dagger piercing some object; below are fruit and ears of maize (pl. 1, fig. 1). The rattle suggests Tzab-ek, the Maya Rattle Asterism, the Pleiades, which represent the sign Taurus at Acanceh. The pierced object recalls Duran's birds pierced by an arrow, which he identifies with Taurus. Below a downward-flying arrow suggests the tzontemocque, stars which fell from heaven with the lord of the dead, that is in November with the sun in Scorpio, the death sign. They were probably Taurid meteors, emanating from that sign, and hence naturally associated with it. They represent Taurus at Acanceh and in the Spear-throwers group in the Dresden Codex.

The fruit and maize are appropriately associated with the Pleiades as the stars of the crops. But this group of symbols is repeated at the west end of the inscription, where it cannot represent the signs named without destroying the sequence; moreover, it alone among the figures of this middle band contains no human figure or deity, so this group either represents only the beginning of the figures or, if it represents Aries and Taurus, signs which begin the zodiacal inscriptions at Mitla and Acanceh, it is used to represent the beginning of the inscription west of the doorway by a kind of astronomic fiction only.

The next group of figures on the left present a man with headdress of quetzal feathers who stands upon a running dog, a dog's head projects forward over his head, and above his ear is the spiral whelk shell symbol eca ilacatz cozcatl[2] (fig. 2). This indicates the Mexican wind god Quetzalcoatl, who, with his brother Xolotl, the Dog, constitutes the Divine Twin, and represents the sign Gemini at Mitla, Acanceh, and generally throughout the Mexican zodiacal symbolism.

The principal dog sacrifice of the Maya ritual took place in the uinal or twenty-day period Pax when the sun was passing through this sign.[3]

[1] Hagar in *Proceedings International Congress of Americanists*, Sixteenth Session, pp. 277 et seq.; ibid, Seventeenth Session, pp. 140 et seq.

[2] Seler in *Bull. 28, Bureau of American Ethnology*, p. 133.

[3] Landa, Relación de las Cosas de Yucatan, Brasseur ed., p. 26.

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In the lower band beneath the deity, a plumed serpent, the most generally used symbol of Quetzalcoatl, issues from a solar disc, indicating the solar passage through this sign.

It suggests the almost identical plumed serpent effigies used in the Soyaluña ceremonies at the Hopi pueblos in Arizona at the winter solstice when the sun is passing out of the opposite sign Sagittarius.

Passing on, there is first the small figure of an ara holding a budding plant, a yellow tongue of downpouring fire or light, symbol of Cauac, a Maya day sign of Cancer, and a glyph of another Cancer day sign, Imix (fig. 3).

The glyph of the third Cancer day sign Ahau also appears in the group, having the meaning "Lord, or mighty personage", but as it is the symbol of the sun god, it is also used at eight other points among the paintings. Beneath are two hands extended palms upward, wrists together, and fingers apart, as if in the attitude of receiving something. At the foot of the group is a down-flying ara. The deity of this group stands in the center looking downward. His red body is covered with water-hook symbols, and over his forehead a pointed white stick projects. Below him are three water-jars, red, white and blue, placed beside an unknown symbol. Behind him is a green bar, probably a symbol of water. This symbolism is consistent throughout. The deity is the water god of Cancer, lord of the pointed staff, the fire-drill, which is figured upon his forehead and gives the name Mamalhuaztli, "fire-sticks", to this asterism in the group described and figured by Tezozomoc and Sahagun. The fire-sticks are connected with the new fire lighted at the June solstice and with the supposed miraculous descent of fire upon an altar at this time. This descent was represented in the form of a down-flying ara or parrot, Kakmo, at Izamal, Acanceh, and in the codices, hence the downpouring flame and the descending ara. At Santa Lucia Cozumalhualpa this flame appears as a deity descending from the sky. Under him an observing priest holds in his hands an object, probably a basin containing water, in which a star or constellation, reflected from the zenith at midnight, marked the entrance of the sun into the Fire-sticks asterism, hence the downward glancing deity and the two outstretched hands emblematic of the mirror-holding priest.[1] The water symbolism conveys the seasonal characteristics of the Cancer month, the beginning of the rains on the Mexican plateau, the height of the rain in Yucatan; and the budding plant pictures the outburst of vegetation at this time.

Next we encounter at the top the fragment of a wheel-like figure surmounting the head of an ocelot, this in turn serving as the headdress of a black deity with one stump leg. Stars and water hooks are painted on his body and cloak. The figure of a ball court (Mexican *tlachco*, Maya *hom*), rests upon his breast, to which is fastened an implement of the game (fig. 4).

The deity is the black Tezcatlipoca, who represents the sign Leo in the Spear-throwers group of the Borgiano codex. He is drawn as an ocelot or jaguar in this group in the other Mexican and Maya codices, and is lord of the ball game. The asterism is the Citlal Tlachtli, or Ball Game asterism, figured as a ball court by Tezozomoc and Sahagun, and also known as the Wheel of the North. The use of the word wheel, indeed, seems suspicious, but the Mexicans probably

[1] Hagar in *American Anthropologist*, N. S., vol. 15, p. 22.

possessed some circular figure, as pictured at the top of this group, which they called a wheel after becoming acquainted with that object through Europeans.

Probably the ball game was ceremonially played during the passage of the sun through the constellation Leo. Tezcatlipoca's stump leg seems to symbolize celestial revolution, since the diety is usually represented with this leg tied to a stake, in which position only circular motion is possible.[1] The black color and the stars probably refer to the night sky and symbolize the beginning of the return of the sun into winter, the night of the year, but the color may also refer to thunderstorms prevalent at this season. The Mayas then painted their bodies with lamp-black, probably in allusion to the same symbolism.[2] A third possibility as to the significance of this black color refers it to the observation of the solsticial stars in the night sky, as on the tablet at Santa Lucia Cozumalhualpa.

In the next group we find a yellow deity holding up a budding plant in his arms (fig. 5). Above him a green sprout issues from a probable variant of the kan imix symbol of fertility and production. The kan glyph, indeed, presents a considerable variation from the usual forms, yet not sufficient to cast much doubt upon its identity when considered with the other two symbols to which it is attached. The maize plant sprouting from the kan sign is figured on page 29 of the Codex Troano. A full-grown maize plant appears on the left of these glyphs. Beneath them is an iguana head facing upward. This and the maize plant form the headdress of the deity. Here is the Tamoanchan ichan, the paradise in the west, presided over by the yellow maize deity, where flowers stand straight up. It is the sign Virgo, associated with woman and the west, under which the yellow maize ripens and is harvested. Generally it is represented by the maize deity, sometimes male, sometimes female. But by Tezozomoc and Sahagun it is named and figured as a female symbol. The Maya maize deity is also known as the god of the kan sign, because so frequently associated with the glyph of Kan, the day sign of Virgo. This glyph, which also suggests the female symbol, as well as its name is derived from the iguana.[3]

The double sign Libra-Scorpio which follows is figured as the death god who rules these signs throughout the astronomic symbolism of the Maya and Mexicans (fig. 6). He wears a white helmet-like headdress ornamented with arrowpoints, the color perhaps suggesting the pallor of death. The upper half of his face is covered by a black mask. This supports a probable identification with the black deity Ek Chuah who is sometimes figured with a scorpion's tail and whose name may conceal that of Ek Chuch, Black Scorpion or Scorpion Asterism. But he may be definitely identified by the triple group of crescents which are painted in yellow upon his collar and again in white below him.[4] A comparison of these crescents with the figures of scorpions in the codices Tro Cortesianus (48*c* and 44*c*) and Nuttall 22 indicates that they are claws of the scorpion, the death insect, which gives its name to this double constellation according to Tezozomoc and Sahagun. The configuration of the stars of Libra and Scorpio presents in fact a conspicuous figure of this insect. The bent knees of the death deity show that he is seated upon a kind of bench, barely outlined

[1] Nuttall, Fundamental Principles of the New and Old World Civilization.
[2] Landa, op. cit., p. 280.
[3] See Tozzer and Allen, Animal Figures in the Maya Codices, p. 318.
[4] Dieseldorff in *Bulletin 28, Bureau of American Ethnology*, p. 665.

below him, in the attitude of the chilan or tlatoani, the oracular priest, consulter of the spirits of the dead, who occupies the position of Libra-Scorpio in the Spear-throwers group at Mitla, Acanceh, and elsewhere.

His usual speech symbol appears in front of his mouth. Before him are four glyphs, ahau above, manik on the right, a modified kin sign in the center. Manik is the day sign of Scorpio; it signifies the grasping hand of death and also of resurrection.[1] It also refers to the western quarter, Chi Kin, when combined with Kin, chi being the sting of the scorpion; kin, sun. Ahau with kin refers to Kinich Ahau, the Sun Eye, Lord of Cancer, and to another quarter, probably north. The diagonal cross which differentiates this kin sign from the usual type may designate the cosmos divided into the four quarters of the cardinal points. These glyphs may direct attention to some supposed special relationship between the sign Scorpio and the cardinal points. The connection of this death sign with the west, the region where the sun and the stars disappear, is readily understood, but the symbolism of the other quarter is not apparent. On the other hand, in spite of the regional significance of these associated glyphs, it is possible that here the reference is merely to the death god of the sun in Scorpio as a special manifestation of the solar deity, the aspect of all the zodiacal gods. At the foot of this group of symbols there is a small symbol containing some suggestions of Tzec or Scorpion, uinal of Scorpio.

Sagittarius is represented by a crouching warrior holding a case full of spears or arrows and defending himself with a spear which projects from under his chin (fig. 7). The same figure represents this sign in the Spear-throwers group of the Dresden codex and a similar figure upon a pyramid at Izamal.[2] A serpent with stars upon his body and from whose mouth a human face projects, forms the head-dress of the god of war. It is the Mexican Mixcoatl, Cloud Serpent of the Milky Way which crosses the zodiac in this sign. Special honors were paid to this form of the war and hunt god at the Quecholli festival celebrated when the sun was in Sagittarius. Over the head of the deity there is a flame-like symbol beside a glyph of Ahau, day sign of Cancer. Probably these symbols refer to Cancer, the fire sign, in the opposite part of the sky. There is a marked tendency in the Maya and Mexican astronomic symbols to associate each sign with its catasterism, in fact there is even a noticeable similarity between some of the day and month symbols and those of the oppposite sign. This may indicate that the position of the sun in a given sign was determined by observation of the stars in opposition at the time, a practice followed by the Pueblo Indians today.

The deity of Capricornus is the aged sun god of the December solstice who is contrasted with the youthful deity of June-July, for the annual solar course was compared with the journey of man through life born at the winter solstice, reaching his prime at the summer solstice, then aging to his death again at the date of his birth (fig. 8).

Capricorn is represented by the same deity in the Maya and Mexican Spear-throwers groups.

The Aquarius deity furnishes the first difficulty of the series. We see the open jaws of an animal or a bird, possibly the vulture-head deity who represents

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[1] Hagar in *American Anthropologist*, N. S., vol. 17, pp. 488 et seq.

[2] See Hagar, ibid., vol. 15, p. 27.

this sign in the Spear-throwers group of the Borgiano codex (fig. 2). It is possible, but not at all certain, that there is the face of a monkey or a rodent within its jaws. The monkey would represent the Mexican day sign Ozomatli, Maya Chuen, pertaining to Aquarius.

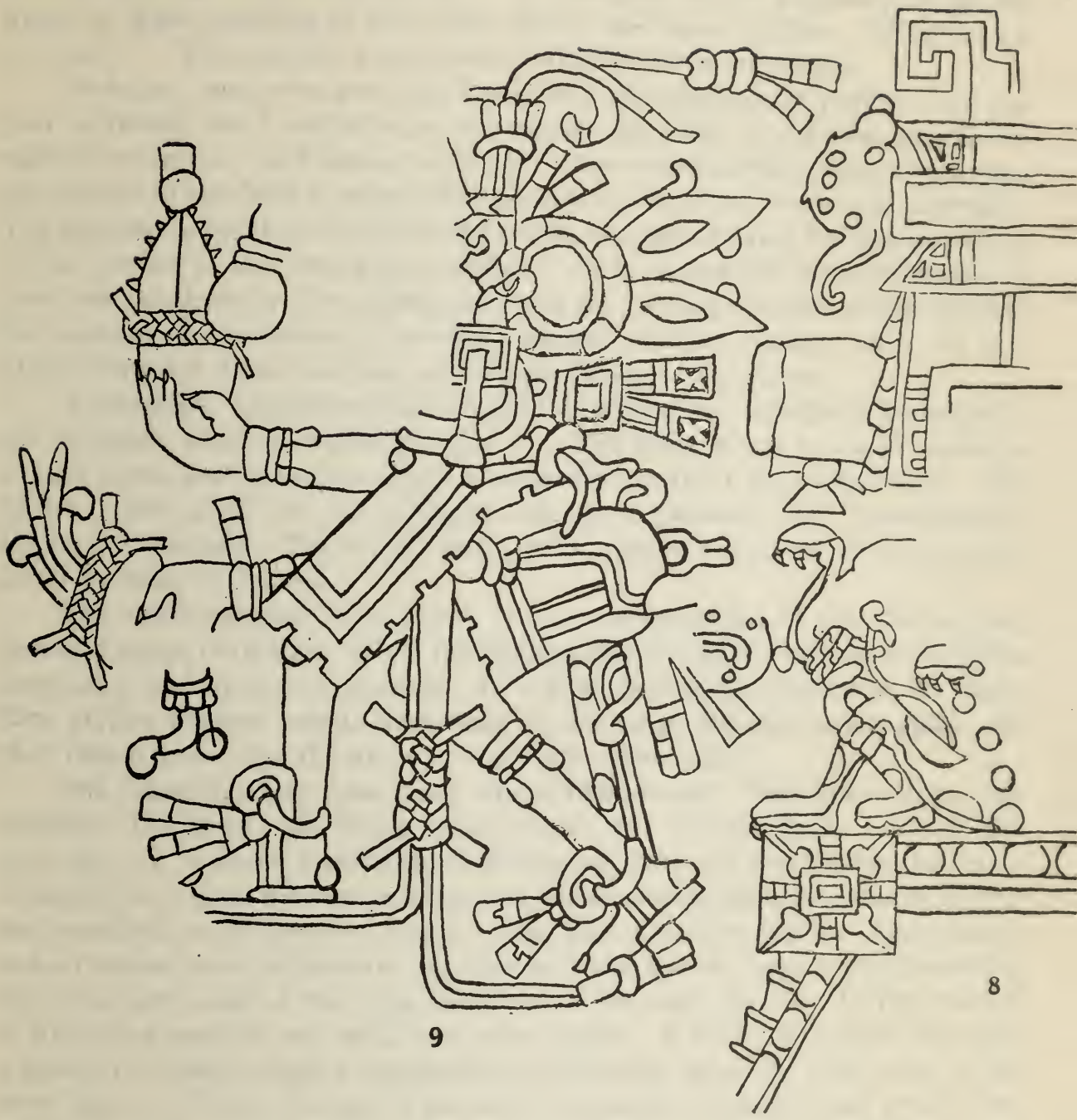
The meanings assigned to Chuen, a hole filled with water, and the mouth of a monkey, suggest the stream of water which pours from a half-inverted jar to the left above the deity and which enters the mouth of the monkey-face god C of Aquarius. This figure is found many times in the Codex Troano. The lower half of a frog is figured over the deity, and may represent the Maya uinal Uo or Frog as a catasterism as at Acanceh, where, however, it seems to occupy the position of Pisces.

In front of the Pisces group of symbols, three knots are tied in a rope (fig. 10). They suggest the name and symbol of the Mexican day sign Malinalli or Twisted of Pisces, as well as the name Knot attached to this sign in Peru and in the Euphratean region. The deity has the face of an old woman. She is the Goddess I of the Maya codices whose face forms the glyph of the day sign Eb of Pisces and who pours water from a jar. It seems probable that the Maya reversed the positions of Aquarius and Pisces, which we represent as the waterman pouring water from a jar into the mouths of the fishes, and that in their uranography the water Goddess of Pisces poured water into the mouth of the monkey god of Aquarius, described above. Over the head of this goddess, according to Gann, are the outstretched wings of an eagle. She is probably the Mexican goddess Ilamatecutli, whose figure is the symbol of the Mexican twenty-day period Tititl of Aquarius. She bears the same relation to the youthful maize goddess of the Virgo ritual that the aged sun god of Capricorn bears to the youthful sun god of Cancer. The east half of the presentation terminates at this point.

Granting that the first group of symbols represents the double sign Aries-Taurus, the symbols of this half cover a complete zodiac from Aries to Pisces inclusive. Unfortunately many of the figures on the western half of the wall have been obliterated, but enough remain to convince us that they present a similar sequence.

Beginning again on the right, the face of the aged goddess appears again on the deity of the first group which repeats the symbols of Pisces (pl. II, fig. 1). Two serpents are intertwined around her. She is undoubtedly the earth Goddess, Ciuacoatl, or Serpent Woman, of the Mexican codices, identified at Cuitlahuac and Xochimilco with the two-headed deer.[1] This animal symbolizes Pisces at Mitla and in the Maya Spear-throwers group, and gives its name to Ceh, the uinal of this sign. Ciuacoatl wears a kind of white helmet somewhat similar to that of the death god of Libra-Scorpio and which apparently takes the place of the cross-bones figured upon the skirt of the Maya Goddess I. This helmet is probably some form of death symbol, here perhaps signifying death in floods. Ciuacoatl was also the mother of Mixcoatl, whom we have seen associated with Sagittarius, nine signs distant. The period of gestation figures in this manner in several of the Mexican zodiacal myths. Over her head are three glyphs, on the right Ben, day sign of Pisces, and on the left Manik, also suggesting death.

[1] Joyce, Mexican Archæology, p. 33.



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The next deity is presented with flesh-colored face, wearing an ocelotl head-dress, and a yellow human skin which covers his entire body and face except around the mouth (fig. 2). The flayed skin is further indicated by the crease on the back and the dislocation of the elbow. He is seated upon a bench and evidently represents the priest of Xipe. In the Tlacaxipehualiztli festival under Aries he dons the skin of a human victim who is sacrificed and flayed and wears it during the ensuing month. "Put on your golden garment," reads the hymn to Xipe, referring to the yellow skin of the flayed victim. "Why does it not rain?" [1] The sacrifice was intended to bring rain for the crops.

Perhaps a man who wore the flayed skin and enacted the part of Xipe was also sacrificed, for a victim who represented the deity of the time period was slain in several of the Mexican festivals. This would confirm Gann's view that the posture of the deity is intended also to convey the idea of torture and sacrifice. The head-dress points to Ix, Mexican Ocelotl, day sign of Aries, but the symbolism of the ocelotl is also death by sacrifice.[2] It is remarkable and interesting to note how consistently throughout the world the varying symbols of Aries present the concept of the bearer of another's burden, whether literally as in the case of the Peruvian llama asterism, or metaphorically as elsewhere.

A profusion of budding plants in the following group introduces Taurus with the Pleiades, stars of vegetation (fig. 3). The deity wears an eagle's head as a head-dress, and a vulture head is suspended in front below his waist. The birds' heads stand for the Mexican day signs Quauhtli and Cozcaquauhtli, Eagle and Vulture. The former day sign is usually associated with Aries, the latter pertains to Taurus.

The accompanying glyph seems to be a variant either of Cib, another day sign of Taurus, or of Kan, which, though assigned to Virgo, is also used to express vegetation and growth in general. It will be noticed that many of the Santa Rita glyphs present unique variations of the uinal and day sign glyphs. Do they characterize a local culture or a priestly refinement?

The following three groups are almost obliterated. The Gemini deity may represent Cuculcan, the Maya Quetzalcoatl, the Divine Twin, Lord of this sign (fig. 4). Cancer apparently possesses no deity on this representation; it is figured as a bird, perhaps the quetzal, which is sometimes substituted for the ara, standing on the glyph of Ahau, the day sign of Cancer (fig. 5). Leo presents a deity whose stern expression may betoken the warrior who is conspicuous in the ritual and some of the representations of this sign (fig. 6). In the position of Virgo the symbols are better preserved again. A baby, or a child, sits upon a basket or cradle, which is supported and elevated upon the right hand of the deity (fig. 7). This is the sign of the west, of woman, of fertility and production, human as well as animal and vegetal, a symbolism consistently depicted by the presentation of the infant to the celestial powers. The group confirms Joyce's view that the Foliated Cross at Palenque is a maize plant.[3] Beside it a priest presents some object, perhaps an infant. In the lower band beneath this group there is a square symbol containing a cruciform figure divided by transverse lines. In the corners are five arrowpoints placed diagonally. This symbol is repeated

[1] Joyce, op. cit., p. 40.
[2] Ibid., p. 61.
[3] Ibid., p. 231.

under the following group. It is probably the board on which the game of patolli is played. The movement of the marker in this game, like that of the ball in the pahom or tlachtli game, represents the celestial journey of the sun, and is therefore appropriately associated with the zodiac. The occurrence of these patolli symbols under Virgo and Libra, and of the tlachtli symbols under Leo, probably indicates that these games were played as part of the zodiacal rituals during the months when the sun was passing through these signs. The figure of Xochipilli, Mexican god of games, sometimes represents the eighth twenty-day period, belonging to Virgo.

The upper part of the next group is occupied by a temple whence issues a speech symbol (fig. 8). It is the temple of the chilan or oracular priest, interpreter of wisdom derived from the spirits of the dead. He rules Libra and Scorpio throughout the zodiacal symbolism of both Maya and Mexicans. Below it is a figure partially obliterated, but its position probably identifies it with the bat god figured on Stela D at Copan, the Chama vase, and the Acanceh inscription. This deity rules the Uinal Tzotz, or Bat of Libra.[1]

The last figure, partially obliterated, is that of a man walking toward the east and carrying with him fruits and flowers (fig. 9). This is certainly not direct symbolism of Scorpio which should occupy this position, so that we may regard it as a terminal symbol only, or as representing Scorpio seasonally as the time of the departure of vegetation with the advent of the dry season.

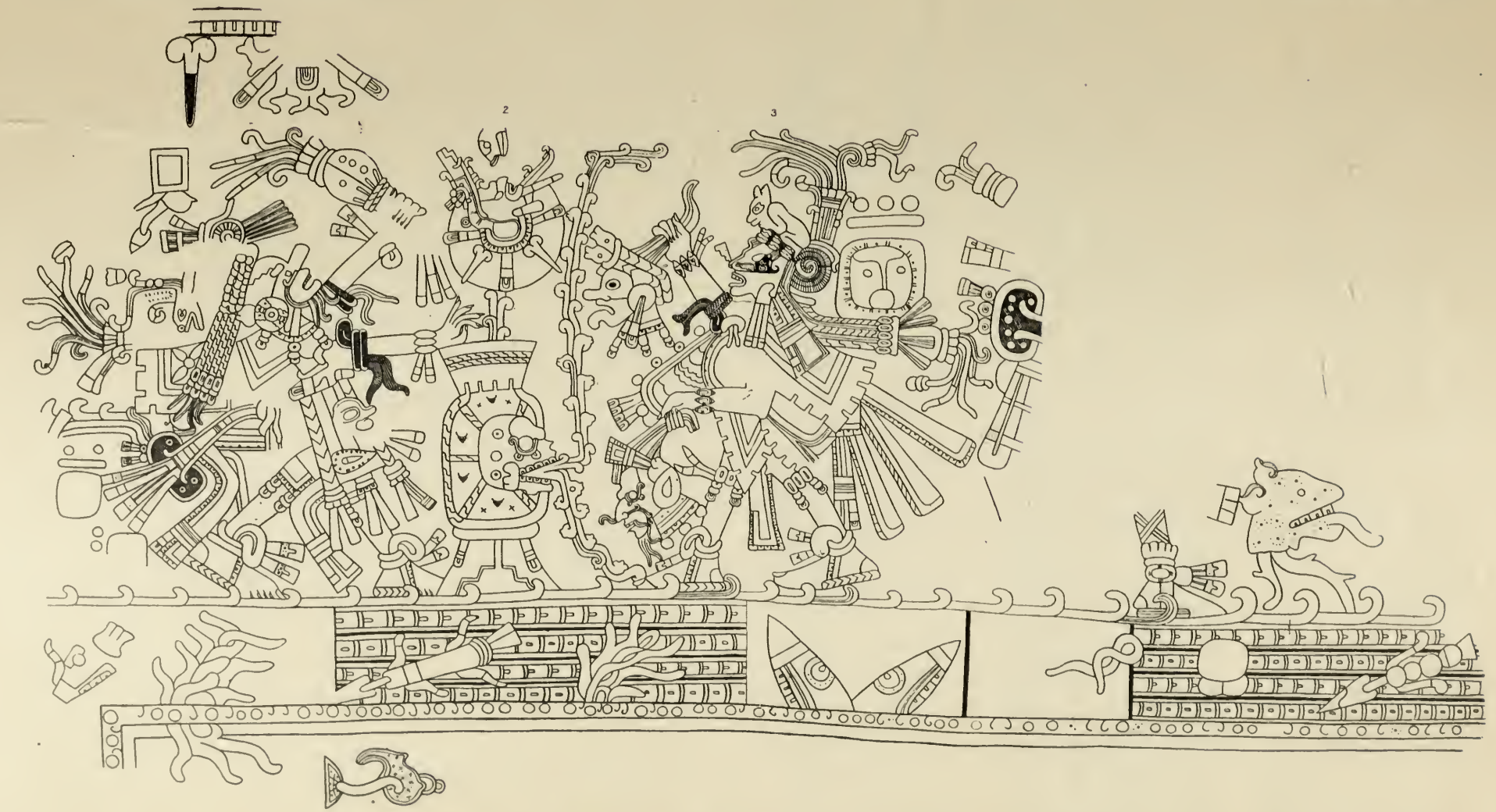
Passing on to the east wall, the only remaining symbols are two contending warriors watched by a third. They may represent Gemini.[2]

No figures remain on the south wall, but on the west wall a portion of the presentation can still be interpreted (pl. III).

Beginning on the left this time, and proceeding toward the right, we meet at once with a much more complex grouping than on the north wall. The first two human figures both seem to refer to Gemini, for both have the spiral whelk shell beside their heads; moreover the one on the left wears symbol similar to edznab, Maya day sign of Gemini, upon his mask, and a dog is placed over the head of the one on the right (figs. 1, 3). Again, each has two serpents twisted side by side round his right arm. The former probably holds a gourd rattle in his left hand and has stone knives round his right wrist. The latter holds in each hand by the hair a decapitated head which seems to bear an intentional resemblance to the head of one of the two deities, and he wears flint knives round both wrists. One severed head is youthful, one aged and misshapen. Perhaps Quetzalcoatl and Xolotl are represented by the pictures, as these deities form the Divine Twin and govern Gemini. Between them is a section of a radiant sun whence protrudes a dragon's jaws inclosing a human face (fig. 2). A serpent's head is above it, and below it an altar beside which is placed a human skull. An elaborate speech symbol issues from its mouth, and around it appears the cauac symbol of rain. Admitting the difficulty of reconciling this group with a definite sequence, I am inclined to believe that the whole scene represents a sacrifice to the sun in the death sign Scorpio held during the uinal Xul, or End, when Cuculcan, the Maya Quetzalcoatl, was supposed annually to end his earth

[1] See Tozzer and Allen, pl. 38, no. 3.

[2] See Gann, op. cit., fig. 5.



PAINTED STUCCO ON WEST WALL, MOUND 1, SANTA RITA. (AFTER GANN)

life. It is possible that the skull itself, with the outpouring "speech" symbol, really represents the Xul glyph, a skull with departing breath, but more likely it is the Tlatoani or priest speaker with the spirits of the dead, a Scorpio symbol. The deities then represent the Gemini asterism, nearly catasteric to Scorpio. They are followed by a very large ahau symbol and what seems to be a fire-stick of Cancer, the remainder of this figure being obliterated. The fragment terminates with the head of an ocelot in the proper position to represent Leo (fig. 4).

Here ends the presentation. Its elaborate symbolism and the conspicuous position of the mound demonstrate the importance of the zodiacal cult at Santa Rita, and the conventionalization of the symbols establish its long existence. It exhibits striking analogies not only with all other American zodiacs from Peru to Arizona, but also with the zodiacs of the eastern hemisphere, and it adds to the evidence of the importance of the zodiacal cult throughout the portions of the two Americas where civilization had been established before the coming of the Spaniards.[1]

BROOKLYN INSTITUTE OF ARTS AND SCIENCES
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[1] Numeral glyphs placed beside nearly all the day-sign glyphs of this inscription probably indicate an additional calendrical significance beyond the scope of this paper.

A MAYA CALENDAR FROM THE ALTA VERA PAZ, GUATEMALA

BY

J. ERIC THOMPSON

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A MAYA CALENDAR FROM THE ALTA VERA PAZ, GUATEMALA[1]

By J. ERIC THOMPSON

ANNUAL calendars, consisting of eighteen months of twenty days each and five odd days at the end of the year, have been reported from various Maya peoples. The most famous of these is that in use in Yucatan at the time of the Spanish conquest and used by present-day writers to designate the month signs found on the monuments of the Old Empire region. Actually, there is no evidence that these names obtained in the Old Empire. Indeed, one might state with some assurance, although positive evidence is lacking, that the Yucatecan names were not employed.

In addition to the Yucatecan annual calendar, the names of the months are also known for the Cakchiquel, Quiche, Pokomchi, and Chuj of Guatemala, and the Tzeltal and Tzotzil of Chiapas, Mexico. The calendars of these peoples are of the same pattern, but in most cases the actual names of the months differ.

Recently the writer came across a calendar of this same general pattern attributable to the Kekchi. The Kekchi are a virile and increasing people of Maya stock. During the past three centuries they have greatly extended their ethnic boundaries, absorbing linguistically scattered groups of Pokomchi, Chol, Lacondon, and Mopan Maya. At the present time they occupy a large part of Guatemala, including most of the Alta Vera Paz department, a part of the Baja Vera Paz department, and the southeast sector of the Peten department. In recent years they have overflowed into British Honduras, and now are in firm occupation of a belt across the south of the colony. They are believed to number somewhere in the neighborhood of 85,000, but it must be remembered that a large number of these Kekchi-speaking peoples are not racially Kekchi.

Some of these foreign groups absorbed by the Kekchi retain certain distinctive customs, beliefs, and peculiarities of pronunciation and grammar, but on the whole they form a homogeneous group.

In the catalogue of the Gates collection[1a] there is listed (item 1024) a

[1] It has just come to the writer's knowledge that Dr. William Gates, in his forthcoming work, A Dictionary of Maya Glyphs, treats of the same Kekchi calendar. The writer has no idea to what extent the two presentations duplicate each other, but he wishes to say that should such duplication exist, it is the result of conclusions reached independently by both Dr. Gates and the writer.—J.E.T.

[1a] The William Gates Collection. Manuscripts, Documents, Printed Literature relating to Mexico and Central America. . . . American Art Association, New York, 1924.

manuscript described as "Manuscript. Kekchi Native Calendar, of good and bad days, 4 to 16 pages. Photographic copy. A remnant of the native divinatory ritual." This photographic copy is now in the Department of Middle American Research, Tulane University.

An examination of a photostat copy showed an almanac of a Christian year with a number of feast days of the Catholic Church marked against the respective days on which they fall, a number of days marked good or bad, and other remarks in Kekchi which also appear to indicate native feasts and festivals. The calendar carries no recognizable date, and both the handwriting and spelling are poor.

The writer's eye was caught by a number of names scattered through the text, alongside of which in every case was placed a cross. It was soon apparent that the names represented a native calendar of typical Maya pattern. One month was missing, probably through an oversight, and two months were displaced one day. The calendar was arranged as follows.

Jan.	10	Yax	Jul.	28	. . . . .[4]
Jan.	30	Zac	Aug.	3	Icat
Feb.	18[2]	Chac	Aug.	23	Chacc[c]at
March	11	Chantemat	. . . . .		[5]
March	31	Uiniu[3]	Oct.	2	Cazeu
April	20	Muhan	Oct.	22	Chichin
May	10	Ahquicou	Nov.	11	Ianguca
May	30	Ccanazi	Dec.	1	Mol
June	19	Olh	Dec.	21	Zihora
July	9	MAHI			

Several of these month names are the same as those of the Yucatecan calendar, and retain the same order, but the five nameless days have been shifted forward one month. The month Mahi corresponds to Pop, and, indeed, in the text Mahi is written in capital letters, as though to call attention to the fact that it is the first month of the year.

There are also correspondences to the Pokomchi calendar of Narcisso.[6] This Pokomchi calendar is a twentieth century survival, and it is clear that

[2] This is a mistake for February 19.

[3] This text is not very clear at this point, and the name may be wrongly transcribed.

[4] The five nameless days. There is a cross, but no name is given. S[n] is written against July 29th, when the five nameless days should begin. This may be a contraction of santo "holy," or just possibly a contraction of sin nombre "nameless."

[5] The name for the month corresponding to September 12 has been omitted, presumably through carelessness.

[6] Franz Termer, Zur Ethnologie und Ethnographie des nördlichen Mittel-Amerika. Ibero-Amerikanisches Arch., 4: 394–395, Berlin, 1930.

at an earlier period the resemblance was closer. This is shown by the two Pokomchi months which Miss Breton[7] lists from the Pokomchi vocabulary attributed to Moran, and written about the end of the seventeenth century. According to this vocabulary the month Canazi ran from June 4 to June 23, and the month Petcat from August 3 to August 22. The displacement of the nameless days has thrown this out. If this is discounted, it is clear that the Pokomchi and Kechi Canazi months correspond to a day, and the Pokomchi Petcat corresponds to the Kekchi Icat, both beginning on August 3, and, as we shall see later, both incorporating the important root cat.

It would appear that this Kekchi calendar, as well as the Pokomchi calendar of Moran's vocabulary, were frozen into the Christian year, to use Dr. Spinden's expressive phrase, some time in the middle of the sixteenth century. If we shift the five nameless days from their present position to immediately after the month Olh, O Mahi falls on July 14, and assuming that O Mahi coincided with the Yucatecan O Pop, this would have occurred between the years 1552 and 1556, or the four preceding years, if the Yucatecan calendar began on 1 Pop.

The first attempt to conquer the Alta Vera Paz region was made in 1535, but it was not until 1549 that the native life was disastrously disturbed by the reductions. In this year the natives of a great part of Guatemala were removed from their old homes, and settled in mission towns under the direct care of the priests. Such a move might very well have proved fatal to the proper functioning of the calendar, and the fact that the date reached, by assuming that O Mahi and O Pop coincided, agrees within about three years, at the outside, with the great reductions is evidence that our assumption is probably correct. Below are given the three calendars, placed side by side. The Narcisso Pokomchi calendar is adjusted so that the months correspond according to the Moran vocabulary.

Yucatecan	*Kekchi*	*Pokomchi*	*Moran*	*Pokomchi*
Pop	Mahi	Kanjalam		
. . . .	Nameless	. . . . .		
Uo	Icat	Makux		Petcat
Zip	Chacc^{c}at	Kaseu		
Zotz	. . . . .	Kanasi		
Tzec	Cazeu	Kanajal		
Xul	Chichin	Tzikin Kij		
Yaxkin	Ianguca	Mox-Kij		
Mol	Mol	Tij-txejk		

[7] Adela C. Breton, Pocomchi Notes, ICA 19: 545–548, 1915.

. . . . .	. . . . .	Nameless	
Chen	Zihora	Yax	
Yax	Yax	Sac	
Zac	Zac	Tsi	
Ceh	Chac	Txip	
Mac	Chantemat	Txantemac	
Kankin	Uiniu	Uniw	
Muan	Muhan	Muwan	
Pax	Ahquicou	Tam	
Kayab	Ccanazi	Sac-gojk	Canazi
Cumhu	Olh	Oj	
Nameless	. . . . .	. . . . .	. . . . .

The months Yax and Zac are common to all three calendars, as, too, is Muan in slightly different form. The equivalent of Mac in Pokomchi—Txantemac—has the same root, and the final t in the Kekchi equivalent month may be due to a slip of the pen. The new calendar, however, seems to stand about halfway between the Yucatecan and Pokomchi calendars. It shares in common with the former the month Mol, and with the latter the months Cazeu, Uiniu, Ccanazi, and Olj, allowing for slight differences in spelling and order.

Doubtless neither of these two calendars originated locally, for had such been the case, the month Yax would have been written Rax, to conform to Pokomchi and Kekchi spelling. It is clear that these calendars must have been borrowed from some nation, which did not use the letter r. Only one month has a letter r in it, and this, as we shall see, is capable of explanation.

It is interesting to note that the month Chac and the month Chacc^{c}at both contain the syllable Chac, which is apparently a Maya root signifying red.[8]

Now the Maya hieroglyph for red is the same as the superfix for these two months, which in the Yucatecan calendar correspond to Zip and Ceh—words which in the Yucatecan language have no connection with this color. This identification is strengthened by the fact that the two months that precede Chac in both calendars mean green and white respectively in all Maya languages, and Chantemat may contain the archaic root for yellow.

If Chac represents the superfix of Chacc^{c}at, one would expect the body of the glyph to mean c^{c}at or cat (the scribe is rather vague as to the difference between c^{c} and c). This is exactly what we find, for the main part of

[8] Karl Sapper in Das Nördliche Mittel-Amerika, 433, lists the following words for red used by the different Maya peoples: Tzakni, Chacni, Chak, Chakak, Chuk, Chöchök, Chöch, tzaj, Tzoj, queak, Quiak, Caj, Cak, Quik, Quiek.

the following month is similar in form, both having identical cross bands, and its name is Icat (in Moran's Pokomchi Petcat). However, when we take it a step forward, and identify the superfix of Icat as i, we are met with an obstacle. The same superfix is found in the ninth month, corresponding to the Yucatecan Chen, but the Kekchi name is Zihora, and there is no apparent connection. However, it is probable that Zihora is a more modern substitution, for the word contains the letter r, which we have seen was not adopted in the case of the month Yax, which normally in Kekchi becomes Rax. Apparently the original calendar was used by a people who did not use the letter r, and only after it was taken over by the Kekchi was the month name Zihora, containing the letter r, brought into use.

We have seen that in some points this new calendar is probably nearer the archaic calendar of the Old Empire than that in use in Yucatan at the time of the conquest. In others, such as the common use of the names Mol, Muan, Yax, and Zac they are probably equally close to the original, while in one or two names, notably Yaxkin, the Yucatecan calendar is clearly closer to the original.

In all probability the archaic Maya calendar will only be reconstructed by a careful comparison of all the calendars that have survived. Unfortunately it is clear that in several of the calendars months have been displaced, and here we are at sea, for the Yucatecan names may also have been displaced in some cases for all we know to the contrary.

We have seen that, although this calendar was in use among the Kekchi, the fact that Rax has not been substituted for Yax shows that it was not of local origin. To whom can we attribute it?

The only neighbors of the Kekchi who do not employ the letter r are the Chol, who until the seventeenth century occupied a broad belt to the north of the Kekchi. It is possible, then, that this Kekchi calendar is of Chol origin, and support for this opinion can be found in the fact, well attested by history, that large communities of Chol were absorbed by the Kekchi in the past three and a half centuries. The fact that the present-day Chol names for white and red are suk and chuk is not an argument against this attribution, for the substitution of u for a is clearly a recent change, which is still incomplete.

Gates[9] has already suggested that the Chol may have been the Maya of the Old Empire, a view which the writer is inclined to accept, although definite proof is lacking. Be this as it may, it is an interesting point that the

[9] W. Gates, The Distribution of the Several Branches of the Mayance Linguistic Stock, *in* S. G. Morley, The Inscriptions at Copan, Appendix 12, Carnegie Institution, Washington, 1920.

calendars, which are closest phonetically to the hieroglyphs, are those which are found among the peoples living closest to the Old Empire region —the Yucatecans, the Tzeltal, and the calendar which we now provisionally assign to the Chol. Less closely related are the Pokomchi and Chuj calendars, which belong to people who live at a greater distance from the Old Empire region, and the calendars of the Quiche and Cakchiquel, who are the farthest removed from the Old Empire region, have very little phonetic relation to the hieroglyphs.

Probably all these peoples had their distinctive calendars, derived from a common archaic calendar, long before the break-up of the Old Empire. Indeed, the Old Empire may have been composed of a number of distinct linguistic stocks with separate names for the months, but using the same hieroglyphs. If such were the case the differences would have been much less then than they are today, for the divergences of the past thousand years would have to be discounted, and, undoubtedly, the severance of facile communication between groups after the disruption of the Old Empire, and, more so, after the Spanish conquest furthered disagreement.

It has already been pointed out that crosses are juxtaposed to the month names in this new calendar. In only one other place are crosses found. Opposite November 8 are two crosses, but no name. By analogy this day should have been of very great importance in the ancient calendar. The equivalent of November 8 in the native calendar is 17 Chichin, which in turn corresponds to 17 Xul in the Yucatecan calendar. Bishop Landa tells us that on the evening of 16 Xul began the great feast of Kukulcan, the Yucatecan Quetzalcoatl. This was probably the most important annual feast in Yucatan, and was associated with the great Mexican feast of Panquetzaliztli. It would appear that this was a feast of very great importance, common to all the Central American and Mexican peoples. In Yucatan the feast was known as Chickaban. It is just possible that there is some connection between this name and the month name Chichin.

A number of names, apparently associated with numerals, may mark days in the sacred 260 day calendar. Oxlahuchacchan, for instance, might correspond to 13 Chicchan of the Yucatecan calendar. Uuck Chab, also, might be a day sign, but so far the writer has not been able to convince himself that such is definitely the case.

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CHICAGO, ILLINOIS

W. C. Gates Esq
with the Regards of Charles P. Bowditch

A METHOD WHICH MAY HAVE BEEN USED BY THE MAYAS IN CALCULATING TIME

BY

CHARLES P. BOWDITCH

CAMBRIDGE
THE UNIVERSITY PRESS
1901

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It is now considered settled that the Initial Series, so-called, of the Maya inscriptions had for the basis of the long count a day 4 Ahau 8 Cumhu, and that in almost all cases by counting forward from that day the number of days as given in the long count, the day and month is reached which is given in the glyphs following the period glyphs.

One method which has been used by Americanists for calculating the position of this day and month in the Maya calendar is as follows:

Calculate the number of days as given in the long count.

Divide the result by 13, and add the remainder to 4, in order to find the number attached to the day sign.

Divide the result by 20 and count forward the remainder from Ahau, in order to find the day. This can of course be simplified by merely counting forward from Ahau the number attached to the kin sign, since all the other periods are exactly divisible by 20.

Divide the result by 365 and count forward the remainder from 8 Cumhu, in order to find the day of the month, and month.

An example is given from Stela 25 of Piedras Negras. Here the Initial Series is (using Goodman's notation) 54.9.8.10.6.16., 10 Cib 9 Mac. This period will then be

	9 × 144,000 =	1,296,000
	8 × 7,200 =	57,600
	10 × 360 =	3,600
	6 × 20 =	120
	16 × 1 =	16
		1,357,336

1,357,336 =	13 × 104,410 + 6	6 + 4 = 10
=	20 × 67,866 + 16	Ahau + 16 = Cib.
=	365 × 3,718 + 266	8 Cumhu + 266 = 9 Mac.

This is a very tedious method and has been simplified by the Tables of Goodman and Gates; but there is nothing to show that the Mayas had such Tables or that they adopted such a long process in order to reach their results. We do not know that they were able to perform long division, and even if they knew how to accomplish this feat, it could not have failed to have been a very complicated matter with their vigesimal system, especially as this system was not regular in the uinal term. Such divisions as 1,357,336 by 365, for instance, would have been avoided in all probability if a simpler way could have been found. The following method is suggested as one which may have been in use among them. I use the plus sign to mean "count forward" and the minus sign to mean "count backward."

1°. *To find the number attached to the day sign.*

To the number attached to the cycle sign, add twice the number attached to the katun sign and four times the number attached to the tun sign, giving the sum the minus sign.

To seven times the number attached to the uinal sign, add the number attached to the kin sign, giving this sum the plus sign.

Add these sums together, adding the result to 4 (of 4 Ahau) if the sign is plus, or subtracting it from 4 if the sign is minus. In the first case subtract as many times 13 as possible from the last sum. In the second case, add to 4 as many times 13 as are needed to make it larger than the number to be subtracted from it. The result is the number attached to the day sign sought for.

2°. *To find the day sign.*

Count forward from Ahau the number of days equal to the number attached to the kin sign. The result is the day sign sought for.

3°. *To find the month and month number.*

Give the plus sign to the long count.

Give the minus sign to the cycle, katun, and tun count of 9.9.16.

Add the two together and give the sum the proper sign.

Multiply the resulting katun number by 100 and the tun number by 5, add the two products, and give the sum the sign opposite to the resulting sign.

Multiply the resulting uinal number by 20 and to the product add the kin sign, giving the sum the sign as given.

Add the last two sums together, giving the final sum the proper sign, and after deducting as many times 365 as possible count backwards or forwards the remainder from 8 Cumhu according to the sign.

It is not impossible that this is the method suggested on page 24 of the Dresden Codex.

For 3°, the following method can be substituted, which is somewhat simpler in the use of the plus and minus signs.

3° (*bis*).

Give the minus sign to the long count, omitting the uinals and kins.

Give the plus sign to the cycle, katun, and tun count of 9.9.16.

Add the two together and give the sum the proper sign.

Multiply the katun number of this sum by 100 and the tun number by 5 and add them together with the proper sign.

Multiply the uinal of the long count by 20 and add the product to the kin number with the plus sign.

Add these last two sums together with the proper sign.

After deducting as many times 365 as possible from this last sum, count backwards or forwards the remainder from 8 Cumhu according to the sign.

I give here three examples from the Inscriptions of these methods of calculation.

Stela 25 of Piedras Negras has the Initial Series 54.9.8.10.6.16., 10 Cib 9 Mac.

1°. $9 \times 1 = 9$ $\quad 6 \times 7 = 42$
$8 \times 2 = 16$ $\quad 16$
$10 \times 4 = 40$
-65 $\quad +58$
$+58$
-7
$4 + 13 = 17 - 7 =$ 10

2°. Ahau + 16 = Cib.

3°. − 9.9.16.0. 0.
+ 9.8.10.6.16.
− 1. 5.11.4.
$1 \times 100 = +100$
$5 \times 5 = +25$ $\quad +125$
$11 \times 20 = -220$
-4 $\quad -224$
-99

8 Cumhu − 99 = 9 Mac.

3° (*bis*).
+ 9.9.16.
− 9.8.10.
+ 1. 6
$1 \times 100 = +100$ $\quad 6 \times 20 = +120$
$6 \times 5 = +30$ $\quad +16$
$+130$ $\quad +136$
$+136$
$+266$

8 Cumhu + 266 = 9 Mac.

Stela 36 of Piedras Negras has the Initial Series 54.9.10.6.5.9., 8 Muluc 2 Zip.

1°. $9 \times 1 = 9$ $\quad 5 \times 7 = 35$
$10 \times 2 = 20$ $\quad 9$
$6 \times 4 = 24$
-53 $\quad +44$
$+44$
-9
$4 + 13 = 17 - 9 =$ 8

2°. Ahau + 9 = Muluc.
3°. − 9. 9.16.0.0.
+ 9.10. 6.5.9.
\+ 10.5.9.
10 × 5 = − 50
5 × 20 = + 100
\+ 9 + 109
\+ 59

8 Cumhu + 59 = 2 Zip.
3° (*bis*).
+ 9. 9.16.
− 9.10. 6.
− 0.10.
10 × 5 = − 50
5 × 20 = + 100
\+ 9 + 109
\+ 59 as before.

On Stela B. of Copan is the Initial Series 54.9.15.0.0.0., 4 Ahau 13 Yax.

1°. 9 × 1 = 9
15 × 2 = 30
− 39 4 + (3 × 13) = 43 − 39 = 4
2°. Ahau + 0 = Ahau.
3°. + 9.15. 0.0.0.
− 9. 9.16.0.0.
\+ 5. 4.0.0.
5 × 100 = − 500
4 × 5 = − 20
− 520
365
− 155

8 Cumhu − 155 = 13 Yax.
3° (*bis*).
− 9.15. 0.
+ 9. 9.16.
− 5. 4.
5 × 100 = − 500 etc. as before.

All these calculations can easily be done in the head, and the

principle can be applied to smaller numbers than those found in the Initial Series.

It may be well to add here a fourth example from page 24 of the Dresden Codex. Here we have the two long counts

9.9.16. 0.0.
9.9. 9.16.0.

Taking the latter count, we find

1°. 9 × 1 = 9 16 × 7 = + 112
9 × 2 = 18
9 × 4 = 36
— 63
+ 112
+ 49
(3 × 13) 39
+ 10 4 + 10 = 14 − 13 = 1

2°. Ahau + 0 = Ahau.

3°. − 9.9.16. 0.0. (found on page 24)
+ 9.9. 9.16.0. " "
— 6. 2.0. " "
6 × 5 = + 30
2 × 20 = − 40
— 10 8 Cumhu − 10 = 18 Kayab.

and 1 Ahau 18 Kayab is found under the second column from the left.

3° (*bis*).

+ 9.9.16. 0.0.
− 9.9. 9.
+ 7.
7 × 5 = + 35
16 × 20 = + 320
+ 355

8 Cumhu + 355 = 18 Kayab as before.

The reason why these results are produced is not far to seek.

1°. Each cycle consists of 144,000 days. This number is divisible by 13 with a remainder of 12. If then we count forward one cycle from a given day, say 4 Ahau, the number of the day will be $4 + 12 = 16 - 13 = 3$. The same result will be produced, if, instead of adding 12, we should subtract 1. To find the day-number after adding two cycles, we must add twice 12 or subtract twice 1, and so on for any number of cycles.

In the same way a katun is 7200 days. This number is divisible by 13 with a remainder of 11. If then we wish to count forward a katun from a given day, we can find the number of that day by adding 11 or by subtracting 2. And so on for any number of katuns.

The 360 days of a tun is divisible by 13 with a remainder of 9. If we wish to count forward from a given day one tun, we shall find the number of the day sought by adding 9 to the number of the given day or by subtracting 4. And so for any number of tuns. In each of these three cases we subtract, so that we may use smaller numbers in our calculations.

But with the uinal, we find that 20 is divisible by 13 with a remainder of 7. So in counting forward one uinal, we can add 7 or subtract 6. There is not much choice here, and so we choose to add, as we do also with the kin number.

2°. As has been already explained, the day sought is found by counting forward the number of the kin sign from the day started from, because all the other period numbers are divisible by 20, the number of days in a day round.

3°. Here our object is to count forward the number of days given in the Initial Series. But in order to bring this count to lower terms without altering its value, we subtract (or give the minus sign to) a period of 72 calendar rounds, or 9.9.16., wherever, as is almost always the case in the Initial Series, the cycle number is a 9. Such a subtraction makes no difference in the final count.

Taking the case of Stela 36 of Piedras Negras, we find the first sum to be + 10.5.9. We have therefore to count forwards 10 tuns, 5 uinals, and 9 kins. Taking up the tuns at first, we can call these ten years, which will bring us to the same month and day of the month with which we started, provided we count back five days for each year. That is we must count back 5 × 10 days or − 50. But we must also count forward the number of days represented by the uinals and kins, which gives

$$\begin{aligned} 5 \times 20 &= + 100 \\ &+ \underline{\ 9} \\ &+ 109 \end{aligned}$$

Deducting the 50 days obtained from the tuns, we have a remainder of + 59, which being counted forward from 8 Cumhu, brings us to 2 Zip.

3° (*bis*). Here we have pursued exactly the same method except that we have changed the signs of the long count and of the 9.9.16., in order not to have so much changing of signs in the later calculations.

It should also be said that the count of 9.9.16. is not the only one which can be used in order to bring lower terms into use. Any number of complete calendar rounds will answer the purpose, though, as the count of 9.9.16. is given on page 24 of the Dresden Codex, and as most of the cycle numbers in the Initial Series are 9's, it has been taken as a convenient number. A complete list of calendar rounds from one to eighty, in the notations of cycles, katuns, tuns, and uinals, is given in the Table.

But probably the Mayas would wish to make this long count coincide with the count which is given in the Books of Chilan Balam, where the count is by katuns which are designated as Katun 13 Ahau, Katun 11 Ahau, Katun, 9 Ahau, etc. This is easily done by adding the cycle number to twice the katun number, deducting as many thirteens as possible and subtracting the remainder from 4 or from 4 increased by 13 or a multiple of 13.

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Thus in the first example, 54.9.8.10.6.16., we take

$$\begin{array}{rr} 9 \times 1 = & -\ 9 \\ 8 \times 2 + & -\ 16 \\ & \hline & -\ 25 \\ & \quad 13 \\ & \hline & -\ 12 \end{array}$$

and $4 + 13 - 12 = 5$, and Katun 5 Ahau is the katun in which this date appears, or, in other words, 5 Ahau is the beginning day of 54.9.8.0.0.0.

Again the second example is 54.9.10.6.5.9. Here we have

$$\begin{array}{rr} 9 \times 1 = & -\ 9 \\ 10 \times 2 = & -\ 20 \\ & \hline & -\ 29 \\ \text{Deduct twice thirteen, or} & \quad 26 \\ & \hline & -\ 3. \end{array}$$

$4 - 3 = 1$, and Katun 1 Ahau is the katun in which the date appears, or 1 Ahau is the beginning day of 54.9.10.0.0.0.

In the third example we have 54.9.15.0.0.0., and the same calculation brings

$$\begin{array}{rr} 9 \times 1 = & -\ 9 \\ 15 \times 2 = & -\ 30 \\ & \hline & -\ 39 \\ \text{Deduct three times thirteen, or} & \quad 39 \\ & \hline & 0 \end{array}$$

$4 - 0 = 4$, and Katun 4 Ahau is the katun in which this date appears, or 4 Ahau is the beginning day of 54.9.15.0.0.0.

And finally on page 24 of the Dresden Codex, where however there is no large glyph at the beginning of the Series as there is

invariably in the Inscriptions, we have 9.9.9.16.0. Here the calculation is

$9 \times 1 =$	$-\ 9$
$9 \times 2 =$	$-\ 18$
	$-\ 27$
Deduct twice thirteen, or	26
	$-\ 1$

$4 - 1 = 3$, and Katun 3 Ahau is the katun in which this date appears.

TABLE.

Calendar Rounds.	*Days.*	*Cycles, etc.*	*Calendar Rounds.*	*Days.*	*Cycles, etc.*
1	18,980	2.12.13.0.	41	778,180	5. 8. 1.11.0.
2	37,960	5. 5. 8.0.	42	797,160	5.10.14. 6.0.
3	56,940	7.18. 3.0.	43	816,140	5.13. 7. 1.0.
4	75,920	10.10.16.0.	44	835,120	5.15.19.14.0.
5	94,900	13. 3.11.0.	45	854,100	5.18.12. 9.0.
6	113,880	15.16. 6.0.	46	873,080	6. 1. 5. 4.0.
7	132,860	18. 9. 1.0.	47	892,060	6. 3.17.17.0.
8	151,840	1. 1. 1.14.0.	48	911,040	6. 6.10.12.0.
9	170,820	1. 3.14. 9.0.	49	930,020	6. 9 3. 7.0.
10	189,800	1. 6. 7. 4.0.	50	949,000	6.11.16. 2.0.
11	208,780	1. 8.19.17.0.	51	967,980	6.14. 8.15.0.
12	227,760	1.11.12.12.0.	52	986,960	6.17. 1.10.0.
13	246,740	1.14. 5. 7.0.	53	1,005,940	6.19.14. 5.0.
14	265,720	1.16.18. 2.0.	54	1,024,920	7. 2. 7. 0.0.
15	284,700	1.19.10.15 0.	55	1,043,900	7. 4.19.13.0.
16	303,680	2. 2. 3.10.0.	56	1,062,880	7. 7.12. 8.0.
17	322,660	2. 4.16. 5.0.	57	1,081,860	7.10. 5. 3.0.
18	341,640	2. 6. 9. 0.0.	58	1,100,840	7.12.17.16.0.
19	360,620	2. 9. 1.13.0.	59	1,119,820	7.15.10.11.0.
20	379,600	2.12.14. 8.0.	60	1,138,800	7.18. 3. 6.0.
21	398,580	2.15. 7. 3.0.	61	1,157,780	8. 0.16. 1.0.
22	417,560	2.17.19.16.0.	62	1,176,760	8. 3. 8.14.0.
23	436,540	3. 0.12.11.0.	63	1,195,740	8. 6. 1. 9.0.
24	455,520	3. 3. 5. 6.0.	64	1,214,720	8. 8.14. 4.0.
25	474,500	3. 5.18. 1.0.	65	1,233,700	8.11. 6.17.0.
26	493,480	3. 8.10.14.0.	66	1,252,680	8.13.19.12.0.
27	512,460	3.11. 3. 9.0.	67	1,271,660	8.16.12. 7.0.
28	531,440	3.13.16. 4.0.	68	1,290,640	8.19. 5. 2.0.
29	550,420	3.16. 8.17.0.	69	1,309,620	9. 1.17.15.0.
30	569,400	3.19. 1.12.0.	70	1,328,600	9. 4.10.10.0.
31	588,380	4. 1.14. 7.0.	71	1,347,580	9. 7. 3. 5.0.
32	607,360	4. 4. 7. 2.0.	72	1,366,560	9. 9.16. 0.0.
33	626,340	4. 6.19.15.0.	73	1,385,540	9.12. 8.13.0.
34	645,320	4. 9.12.10.0.	74	1,404,520	9.15. 1. 8.0.
35	664,300	4.12. 5. 5.0.	75	1,423,500	9.17.14. 3.0.
36	683,280	4.14.18. 0.0.	76	1,442,480	10. 0. 6.16.0.
37	702,260	4.17.10.13.0.	77	1,461,460	10. 2.19.11.0.
38	721,240	5. 0. 3. 8.0.	78	1,480,440	10. 5.12. 6.0.
39	740,220	5. 2.16. 3.0.	79	1,499,420	10. 8. 5. 1.0.
40	759,200	5. 5. 8.16.0.	80	1,518,400	10.10.17.14.0.

MAYA INSCRIPTIONS VI: THE LUNAR CALENDAR AND ITS RELATION TO MAYA HISTORY

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BY
JOHN E. TEEPLE, 1874-1931

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MAYA INSCRIPTIONS VI

THE LUNAR CALENDAR AND ITS RELATION TO MAYA HISTORY

By JOHN E. TEEPLE

RECENT study of Maya inscriptions, particularly those containing dates and moon series attached, has given the writer an historical picture of Central America which may or may not be correct, but is at least suggestive. The territory covered extends from the Peten district on the northeast to Copan on the southeast, to Palenque on the west, and probably to the mountains on the southwest. The records start in the Peten district in the northeast about 8.14.0.0.0 (317 A.D.)[1]. They had extended to Copan probably by 9.1.0.0.0 (455 A.D.) and to Palenque by 9.4.0.0.0 (514 A.D.), and during the next hundred years had appeared at most of the intermediate places with which we are familiar.

The picture we get of this region from 9.0.0.0.0 to 9.12.10.0.0 (435 A.D. to 682 A.D.) is that of a considerable number of more or less independent communities united by the use of the same calendar, the same general system of hieroglyphic writing, and similar lunar calendars. Their lunar calendars all agree at any given date, within a day or two, on the age of the moon. They may differ on whether the moon is 19 or 20 days old at a given date, but the agreement is as close as we could expect if the statement of the age of the moon is based on observation and not on a fixed calendar. At least there is no evidence of an uncorrected cumulative error. There is, however, a wide difference in their statements regarding the position of the moon in the lunar year. Whether at a given date the moon is the first or the third or the sixth moon of a lunar half year differs from city to city.

[1] Christian dates throughout this article are given only for ease of comparison and not as statements of fact. I have used the correlation first suggested by Goodman and later revived by Martinez and Thompson, placing 11.16.0.0.0 about November 3, 1539 Julian, not because I feel it is yet proved, but because it is the only one so far suggested which shows fair agreement with the astronomy of the inscriptions, and at the same time has some definite support in the early Spanish period.

Apparently at this stage the Maya were undergoing the effort which almost all people have gone through: they once had a lunar calendar, later discovered a better approximate solar calendar, and were endeavoring by interpolation of whole moon months from time to time to keep the lunar calendar in some sort of relation to the solar calendar. This is a familiar picture in all history. The calendar was in the hands of the priests, and the priest in authority inserted the additional moons at whatever period seemed best to him, or omitted them when he liked. So long as he dealt with the insertion or omission of whole moons, however, the days from new moon would be uniform throughout the territory, and this we find to be the case in the Maya region.

From the earliest contemporary statements of the position of the moon now available, say at 8.16.0.0.0 (356 A.D.) to the latest one 10.2.9.1.9 (878 A.D.), a period of over 500 years, we have over one hundred rather complete dates with moon series attached. Since the age of the moon is so nearly uniform throughout, never varying more than a couple of days from the calculated mean, we may assume that we are dealing with observation data and not with a formal calendar, or if it is a formal calendar it is then so frequently corrected by observations that no cumulative error can be traced. The positions of the moon in the lunar year, however, lacking this uniformity, may be traced as a symptom or trait, and by this symptom we are able to divide the whole 500–600 years of Maya occupancy into three parts, based on the treatment of the lunar year.

Period 1. Independence.—From the beginning to about 9.12.10.0.0 (682 A.D.). A period of non-uniformity when each city was apparently trying to coordinate its lunar calendar to its solar calendar by interpolations in its own way, and this way was different in different cities.

Period 2. Unity.—From 9.12.15.0.0 to about 9.16.5.0.0 (687 A.D. to 756 A.D.), during which the lunar calendar under the leadership possibly of Palenque was standardized into a lunar year of exactly 12 moons, and any attempt to correlate it with the solar year or the Maya year was abandoned. This standardization proceeded rather rapidly from city to city until, by 9.13.0.0.0

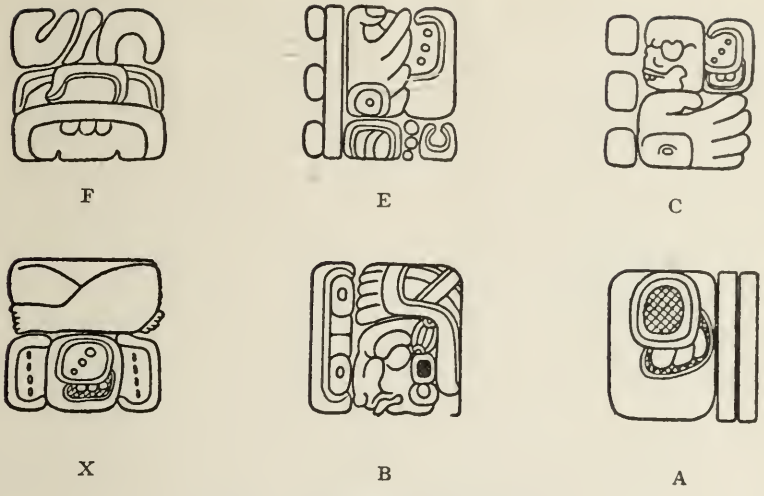

Fig. 1. Piedras Negras, stela 1.

Fig. 2. Piedras Negras, stela 3.

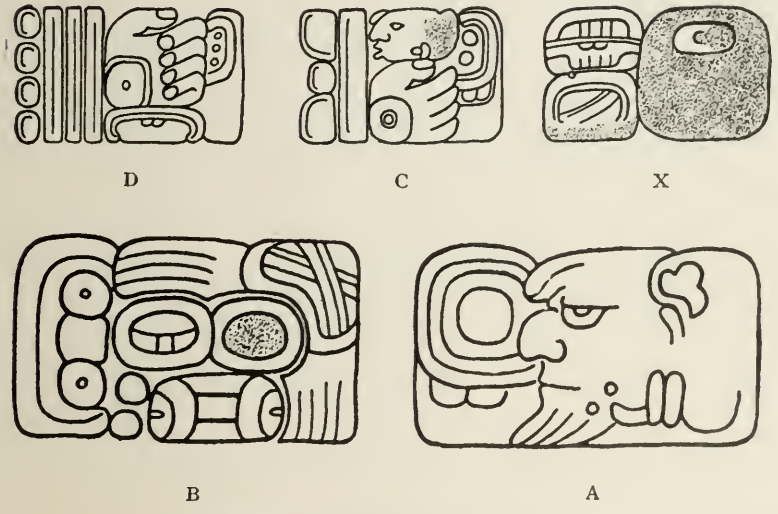

Fig. 3. Naranjo, stela 29.

(692 A.D.) every city that was erecting monuments had adopted it.

Period 3. Revolt.—From 9.16.5.0.0 to the latest dates (756 A.D. to 878 A.D.). At the beginning of this period Copan abandoned the standard lunar year and adopted instead a lunar year to coincide approximately with the eclipse periods, giving thus an occasional lunar year of only 11 moons, such as we find in the eclipse table of the Dresden Codex. The other cities did not immediately follow this lead (but ultimately it looks as if Naranjo did). Quirigua abandoned the standard method at about the same time but did not follow the Copan method, and thereafter pursued an independent course, finally reverting to the standard method for the moon numbers but disagreeing with everything on the age of the moon. Soon after this the erection of monuments with complete dates seems to have ceased and we cannot follow the question further.

This is a rough outline of the history of one symptom, trait or idea, as I interpret it, but it may be suggestive in showing relationships that will lead to something more important than the mere status of the lunar calendar.

The Standard Calendar

During the period of unity the practice in all Maya territory, so far as we know, was so uniform that a description of the different g'yphs at that time may be of interest. (See figs. 2, 4, and 6.) (Figures illustrated have been taken from Dr. Morley's drawings in the Holmes Anniversary volume.)

Glyphs G and F.—I have nothing of interest to add to what has already been so clearly stated by Dr. Morley. Glyph G seems to refer to the sun, and glyph F is always associated with the moon series or a lunar computation. Beyond this I do not know their meaning.

Glyphs E and D.—Glyph E is used when the age of the moon is 20 days or over, the coefficient of E being added to 20 to determine the number of days from new moon. Glyph D is not counted unless it has a coefficient. If it has a coefficient then glyph E never has one. The coefficient of glyph D represents the number of days from new moon when the days are less than 20.

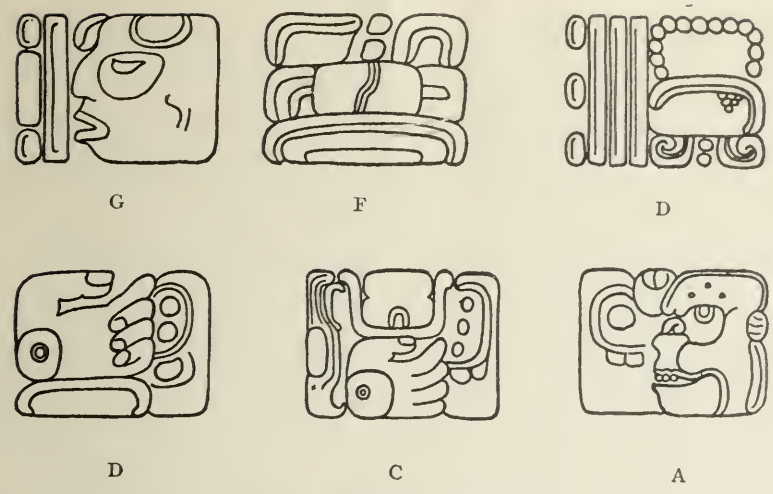

Fig. 4. Naranjo, stela 24.

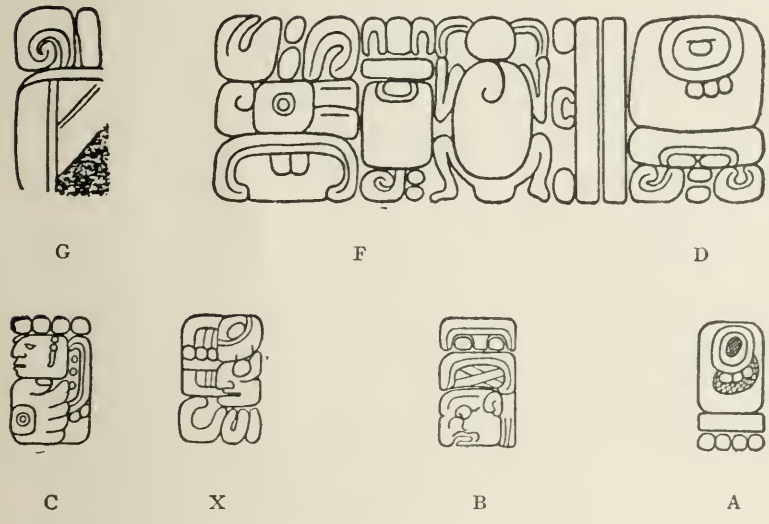

Fig. 5. Yaxchilan, stela 11 (front).

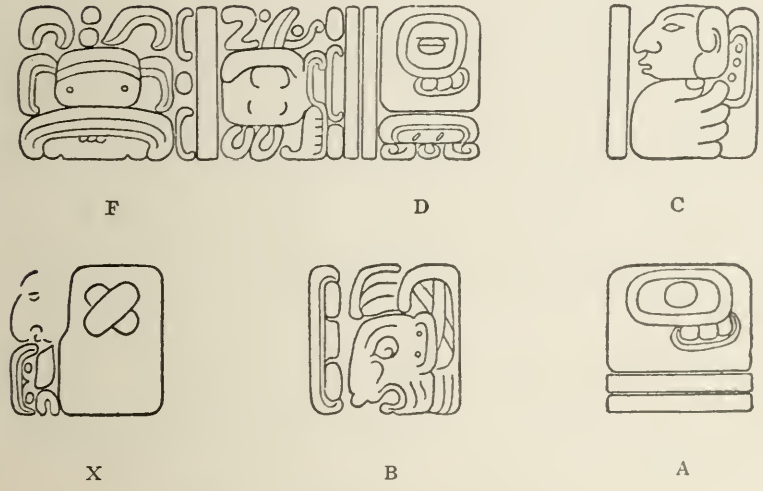

Fig. 6. Yaxchilan, stela 11 (side).

There are three possible positions from which new moon might be counted. First, from the disappearance of the old moon; second, from the actual conjunction; or third, from the first appearance of new moon. During the period of the standard calendar I am inclined to think the count was from the first appearance of new moon, or possibly from conjunction, while during the period of independence the count began earlier, probably from the disappearance of the old moon. There was apparently a one-day change at the time of the introduction of the standard calendar, and this would be just about the amount necessary to change from the disappearance of the old moon to the first appearance of the new moon. In Spanish times Bishop Landa states that "the count of the moon was from the time when it rises new," and this probably means from the appearance of new moon rather than from the conjunction some hours earlier.

It should be mentioned again that the count of D and E was essentially uniform and in relation to observation no matter whether we are in the period of independence, of unity, or of revolt.[2]

Glyph C.—The coefficient of glyph C probably indicates the number of completed moons since the end of the last lunar half year, but we cannot overlook the possibility that it might indicate the number of the current moon. A series of faces either indicating numbers or gods form a part of glyph C, but I do not understand their significance. They may place the month in the lunar year since the numbers from 1 to 6 only place it in the lunar half year, but it seems to me more probable that they represent divinities to whom the particular moon was consecrated.

Glyph X.—This glyph is the most variable of any in the series, and inspection shows that its variation is associated with the number of the moon in the moon half year, i.e., with the coefficient of glyph C, regardless of the position of the date in relation to the tun, the Maya year, or the tropical year. If the coefficient of C is changed for any given date, then X changes accordingly

[2] The first record is 8.16.0.0.0 at Uaxactun recorded 5 E. The last entirely trustworthy one is 9.18.10.0.9 at Naranjo recorded 1 E. From these we deduce 162,004 days for 5486 moons, which checks absolutely with 162,004 or 162,005 days formed from modern moon tables.

although the Maya day, month, and long count remain unchanged (see figs. 1–6).

Any given glyph for X seems to be associated with two adjacent moon numbers, as though X might give a name or a description to thirds of the lunar half year, that is, to 2 consecutive moons. For example, the glyph for God C (see glyph X in fig. 2) never occurs unless the glyph C coefficient is either 1 or 2. This form of X is present in nearly every case where the coefficient of C is 1, and in not quite half the cases where C is 2. One other form of X is found three or four times (see fig. 7), and this form only occurs when C is 2.

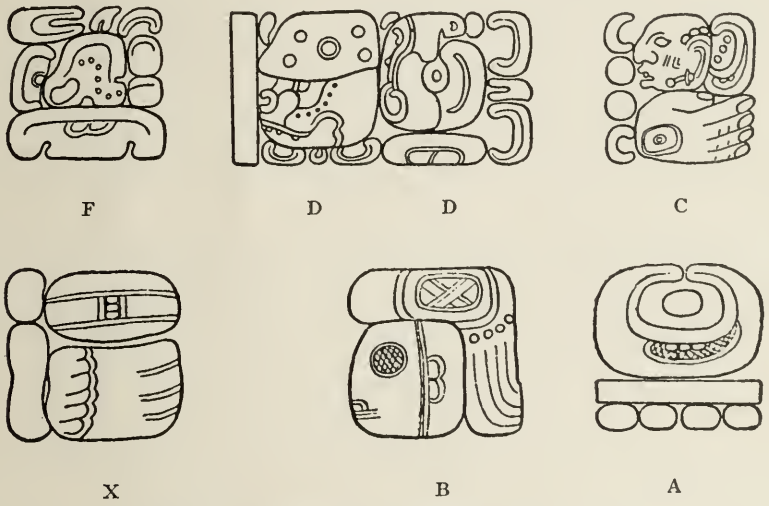

Fig. 7. Palenque, Temple of The Cross.

In figure 1 the glyph for X shows prominently a pair of crossed legs. This is a very common form of the X glyph but is never used unless the C coefficient is either 3 or 4. The only exception to this so far as I have found, is in lintel 29 at Yaxchilan where X is represented by crossed legs and C is apparently 5. A face with the tun sign, a 10 tun sign, or the Zero sign before it (see glyph X in fig. 5) is found when the C coefficient is either 4 or 5. The one exception to this is on stela 14 at Piedras Negras, where this combination occurs with 3C instead of 4 or 5C, but in this particular case the date given is only 3 or 4 days before 4C. In the form of glyph X shown in figure 3 the upper left-hand part of the glyph appears only in connection with 6C. This same symbol

occurs on the usual face numeral for 12 and is fairly common in the inscriptions. I think it is likely the sign for the 12 moon lunar year. It is a very old glyph, as old as the Leyden plate, whose date shows the end of a moon and probably a lunar year.

A few other glyphs are repeated once or twice, but the above sufficiently indicates that glyph X refers to certain divisions of the lunar half year, associated with the number of the moon in that period. We probably, however, have insufficient data to recover these divisions and reconstitute the year exactly.

Glyph B.—Glyph B is very uniform in all inscriptions. It contains an ending sign prefix, an elbow with crossed bands, and within the elbow either 2 circles and an oval (fig. 3) or an animal head, possibly a jaguar (figs. 1, 5, 6). I take glyph B to signify that the end of a moon will be a 29 or a 30 day moon as shown in glyph A immediately following it, but whether the reference is to the current moon or to the recently completed one is uncertain.

Glyph A.—Glyph A with coefficient 9 indicates a 29 day moon, and with coefficient 10 indicates a 30 day moon. This has been known for a long time. This is one place where we get some indication that the lunar calendar might have been a formal one. If we examine the occurrence of 29 and 30 day moons we find more regularity than the laws of chance would lead us to expect. When glyph C is 1, 3, or 5, the number of 30 day moons is nearly 3 times the number of 29 day moons, and when glyph C is 2, 4, or 6, the number of 29 day moons is nearly 3 times the number of 30 day moons. This indicates a certain formalizing of the calendar with alternating 29 and 30 day moons, but there are a good many exceptions, more than would be necessary simply to keep a formal calendar in adjustment.

Also we find that when at Piedras Negras a date was changed from 3C to 2C (figs. 1, 2) glyph A was changed from 30 to 29. At Naranjo a change of C from 6 to 1 was accompanied by a change in A from 29 to 30 (figs. 3, 4), and at Yaxchilan a change of C from 4 to 5 meant a change of A from 29 to 30 (figs. 5, 6). The general tendency was evidently for an odd C to be associated with 30 days in A, and an even C with 29 days, and this ndicates

the possibility of a formal lunar calendar, which however must have been corrected at very frequent intervals so that it was never more than 1 or 2 days out of adjustment with observation.

Other Glyphs.—Between glyph F and glyph E there sometimes occurs a small kin sign with arms and legs. This is in most of the inscriptions at Yaxchilan (see figs. 5, 6), in the two that are known from Ixkun, in the one from Holactun, and in one from Copan. I have no idea what it means nor how to use the numerical coefficient often associated with it, nor do I understand the coefficients 5, 7, or 9 often attached to glyph G.

The above gives a summary of the standardized moon series so far as we can explain it. This form was used universally in the Maya area from 9.12.15.0.0 to 9.16.5.0.0, and in some places later. It is a uniform lunar half year of six moons with no moon interpolations and no attempt to reconcile it with the solar year, the Maya year, or the tun. It was, however, in close agreement with actual moon movements. The count of the moon age was probably from the actual appearance of new moon. The calendar was likely formal in its arrangement of 29 and 30 day moons, but if so it was corrected by the addition of a day often enough to keep it in correspondence with the actual new moon.

Evidence for Standardization

Our thesis is that a period of independence in numbering the moons of the lunar calendar was followed by a period of uniformity. The uniform calendar may be defined with sufficient precision as one which would write 9.16.0.0.0 as about 5C 5D, i.e., 5 days and 5 moons after the beginning of a lunar half year, all lunar half years being exactly six moons. The evidence will be of two kinds; first, a series of double dates like the three pairs, illustrated in figures 1–6, and second a list of dates from each city showing agreement after adoption of the standard, and lack of agreement before. It will be simpler to consider the cities separately. While the movement probably began at Palenque, the spread to other cities will be given first.

1. Piedras Negras.—Standard lunar calendar adopted between 9.12.10.0.0 (682 A.D.) and 9.12.15.0.0 (687 A.D.) and used until

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9.18.0.0.0 (790 A.D.). For a point of departure the date 9.12.2.0.16 (674 A.D.) was selected and its date stated in terms of the old calendar (fig. 1) as 3C 8E and of the standard calendar (fig. 2) as 2C 7E. These statements were made about 20 years after the adoption of the calendar.

DATES IN STANDARD LUNAR CALENDAR

		Glyph C given	*Glyph C expected*
Stela 6	9.12.15.0.0	4	4
" 2	9.13.5.0.0	6	6
" 4	9.13.10.0.0	-	1
" 1	9.13.15.0.0	2	2
" 3	9.14.0.0.0	3	3
" 5	9.14.5.0.0	4	4
" 7	9.14.10.0.0	5	5
" 11	9.15.0.0.0	-	1
" 9	9.15.5.0.0	2	2
" 10	9.15.10.0.0	3	3
" 40	9.15.14.9.13	4	4
Altar 2′	9.16.0.0.0	-	5
Stela 16	9.16.15.0.0	2	2
" 13	9.17.0.0.0	-	3
" 3	9.12.2.0.16	2	2
" 8	9.11.12.7.2	5	5

The last two dates of course are on monuments erected after 9.12.10.0.0

DATES DURING PERIOD OF INDEPENDENCE

		Glyph C given	*Glyph C expected*
Stela 38	9.12.10.0.0	2	3
" 39	9.12.5.0.0	-	2
" 37	9.12.0.0.0	5	1
" 35	9.11.9.8.6	-	5
Lintel 2	9.11.6.2.1	5	6
Stela 1	9.12.2.0.16	3	2
" 36	9.10.6.5.9	4	5
" 31	9.10.5.0.0	3	1
" 26	9.9.15.0.0	5	5
" 25	9.8.10.6.16	3	5
" 30	9.5.0.0.0	5	5

These two lists are rather striking. There are enough dates at Piedras Negras to give a clear picture, and thanks to the courtesy of Dr. Morley I have been able to study photostats of all his

drawings. During one hundred years after the adoption of the uniform calendar we have sixteen dates, and glyph C can be read in twelve of them. Without exception they are given as we should expect. During the preceding one hundred and fifty years we have eleven dates, and glyph C can be read in nine of them. Only two of the nine have the coefficient that we would compute and this is about the proportion we should expect from chance alone. This covers all Piedras Negras dates except two late ones after 9.18.0.0.0. Hence we conclude definitely that at 9.12.10.0.0 (682 A.D.) Piedras Negras was still using her old lunar calendar and at 9.12.15.0.0 (687 A.D.) she had adopted the new one.

2. Copan.—Standard lunar calendar adopted by 9.13.0.0.0 (692 A.D.), the computations being made on altars H′ and I′ and point of departure being date 9.12.8.3.9. There are 15 dates on monuments pretty surely constructed before 9.13.0.0.0 (692 A.D.) where C can be read. Only one has the C coefficient we should expect from the uniform calendar. This is 9.10.19.13.0 on stela 10, and even it may be of later construction. Then comes the date 9.13.3.7.8 on the hieroglyphic stairway, date of writing not known and reading not sure, then uniformity, as follows:

		Glyph C given	*Glyph C expected*
Altar H′	9.12.8.3.9	5	5
Stela J	9.13.10.0.0	1	1
" 5	9.13.15.1.0	3	3
" A	9.14.19.8.0	6	6
" D	9.15.5.0.0	2	2

Entire agreement, and no more dates given until 9.16.5.0.0 when something entirely new starts at Copan.

3. Naranjo.—Uniform lunar calendar adopted at least as early as 9.13.10.0.0 (702 A.D.) when stela 24 was erected, and probably earlier. Point of departure used 9.12.10.5.12, which is given on stela 29 (fig. 3) by their old calendar as 6C 19D, and on stela 24 (fig. 4) by the uniform calendar as 1C 18D. There are no earlier dates with moon series. Then comes stela 22, 9.12.15.13.7; if the coefficient of C here is 1 it agrees with the uniform system. Stela 23 the date is doubtful.

		Glyph C given	*Glyph C expected*
Stela 30	9.14.3.0.0	4	4
" 13	9.17.10.0.0	4	4
" 14	9 17.13.4.3	3	2
" 8	9.18.10.0.0	2	2

One disagreement, probably showing revolt.

4. Yaxchilan.—Date of adoption doubtful due to absence of contemporary dated monuments. It may have been as early as 9.12.15.0.0, the same as Piedras Negras. Double dates are given on stela 11 showing 9.16.1.0.0 as 4C 12D by the old system (fig. 5) and 5C 12D by the uniform calendar (fig. 6). Also date 9.0.19.2.4 is given correctly on a late monument as 3C. During the period of independence we have only two dates, on stela 6 and altar 44, neither in agreement with the uniform calendar After 9.12.10.0.0 we have all in agreement. I have omitted only the date on lintel 26 which is a doubtful reading.

		Glyph C given	*Glyph C expected*
Lintel 21	9.0.19.2.4	3	3
" 29	9.13.17.12.10	5	5
" 98	9.15.6.13.1	5	5
" 46	9.15.14.8.14	3	3
Stela 11	9.16.1.0.0	5	5
" 1	9.16.10.0.0	1	1

5. Quirigua.—This place was probably not founded until after the uniform calendar was in general use, so it started right, using as point of departure the date 9.14.13.4.17. Soon after 9.16.5.0.0 however, when Copan abandoned the uniform system, Quirigua abandoned it also, but not to follow the lead of Copan.

PERIOD OF UNITY

		Glyph C given	*Glyph C expected*
Altar S	9.15.15.0.0	4	4
Stela H	9.16.0.0.0	5	5
" J	9.16.5.0.0	6	6
" E	9.14.13.4.17	3	3
" D	9.16.13.4.17	4	4

The last two dates are on later monuments erected after the standard system had been abandoned and purposely dated back according to the abandoned system, although the main dates on the same monuments are not.

PERIOD OF REVOLT

		Glyph C given	*Glyph C expected*
Stela F	9.16.10.0.0	6	1
" D	9.16.15.0.0	1	2
" E	9.17.0.0.0	2	3
" A	9.17.5.0.0	2	3
" B	9.17.10.0.0	–	4
" G	9.17.15.0.0	5	5
" O	9.18.0.0.0	–	6
" P	9.18.5.0.0	4	1
" I	9.18.10.0.0	2	2
" K	9.18.15.0.0	3	3
Struct. 1	9.19.0.0.0	4	4

The last three dates for some reason return to the expected C glyphs, but they differ entirely from all other Maya inscriptions in the statement of glyphs D and E, the moon age count.

6. Other cities.—El Cayo was using the uniform system when the lintel having date 9.16.0.2.16 was placed. La Honradez in 9.17.0.0.0. Ixkun had probably revolted from it by 9.17.9.0.13. Tila had not begun its use in 9.12.13.0.0. Nor Tikal in 9.4.0.0.0. Chichen Itza was not using it in 10.2.9.1.9, nor Uaxactun in 10.0.0.0.0.

7. Palenque.—The situation at Palenque is confused owing to the absence of contemporary dates with moon series. We actually have only one, 9.12.6.5.8, 5C 19D. If this reading is correct it does not agree with the uniform calendar, which calls for 6C at that date. On the other hand, the tablets at Palenque deal with long computations on the lunar year, extending thousands of years into the past, but do they favor or oppose the uniform system? In the distant past they were sure that 4 Ahau 8 Cumhu was 6C 4E, but their ideas about their present are not explicitly given in shape for us to read. If in the long computations at Palenque they used the factor 11.0.0.0 = 2682 moons or $223\frac{1}{2}$ lunar

years, as seems probable and as was apparently done at Copan, then computing from the ancient dates we find their contemporary dates agreed with the uniform calendar. If they used the factor 1.13.4.0 of the Dresden Codex then they were in error 1 moon. I think they used the 11.0.0.0 factor, and so were in agreement when the tablets were written in 9.13.0.0.0 or earlier.

Three indications make me think that Palenque probably originated the idea.

First, the tablet in the Temple of Inscriptions seems to indicate that 9.12.0.0.0 was 2C, which would agree with the new calendar, but the statement is vague and inconclusive.

Second, when the other cities adopted the new system they often seemed to take dates that were important at Palenque for their point of departure. Yaxchilan selected 9.0.19.2.4, 3C 7D, which is just 243 lunar years (3 to the 5th power if that means anything) from the Palenque 3 Caban 15 Mol. Quirigua selected 9.14.13.4.17, 3C 7D, just 1 moon period of 1.14.17.0 or $35\frac{1}{2}$ lunar years from the same date. The first contemporary date given correctly at Copan in the uniform system 9.13.10.0.0 is just 20 lunar years from the double date used at Naranjo, 9.12.10.5.12, and the latter in turn seems to be based on the one stela cited above from Palenque.

Third, in each case of double date, besides altering the moon number to agree with the uniform calendar, the cities have also decreased the moon age by 1 day (I am not sure whether this was done in the double date at Yaxchilan). This means to me that the uniform calendar began the month with first appearance of new moon, while the older custom had been in most cases to begin the month about a day earlier after the disappearance of the old moon. At Palenque the same thing is probably expressed by changing from 2 Cib 14 Mol to 3 Caban 15 Mol, leaving the moon age unchanged.

These three things indicate that Palenque was an early and important part of the movement, possibly as originator, possibly as one of the earliest converts, possibly as an opponent. Her history ceased so soon after 9.13.0.0.0 that she may have been a conqueror moving into new territory and leaving the old

site, or she may have been an opponent vanquished or driven away.

Period of Revolt

We have seen evidence of independence in Period 1 (up to 9.12.15.0.0), evidence of unity in Period 2 (during the next 70 to 120 years), and we now come to Period 3, the revolt. The first evidence is from Copan in the extreme southeastern corner of the territory. In 9.16.5.0.0 when all was harmony she erected stela M. Its lunar date at that time would have been written in any city in the Maya territory as 6C 4 or 5D. Copan deliberately dated it 5C 5D. Stela N in 9.16.10.0.0 by her new system was dated 1C 1D, but accidentally the standard system would have agreed on 1C also. Her third date, 9.16.12.5.17, 6 Caban 10 Mol, by the standard calendar would have been 5C and about 12D, but Copan dated it 6C and probably 12D. The altar which commemorates this event shows the famous astronomical congress in session. It was a very important occasion. In fact I consider it very probable that in these three monuments we have the origin of the method of making lunar years accord with eclipse syzygies as shown in the Dresden Codex table, but that does not concern us now.

Copan broke away from the uniform system, and five years later Quirigua on stela F (9.16.10.0.0) wrote 6C when every other city was writing 1C. Quirigua was never afterward in complete agreement with the standard calendar, except once in 9.17.15.0.0 and this was probably accidental. Indeed, in stela C she broke away entirely from the Palenque computation that 4 Ahau 8 Cumhu was 6C 4E and wrote it 3C 6E. The extreme southeast was gone. In 9.17.9.0.13 Ixkun disagrees, in 9.17.13.4.13 Naranjo does, and after 9.18.0.0.0 Piedras Negras disagrees for the first time in over one hundred years. The dates are becoming very scarce and we cannot follow them much further. After 9.18.0.0.0 I find only one single date in agreement with the standard calendar (9.18.10.0.0 at Naranjo), and this may be an accidental one. Soon afterward historical monuments here all cease. Unfortunately up to the present there is nothing available to enable us to bring Yucatan into the picture.

Summary

We have indicated fairly clearly the nature of the lunar calendar and the use of most of the glyphs in the moon series, at least during the period of uniformity. We have been able by this trait to trace the Maya cities through two or three hundred years of independence, followed by less than one hundred years of complete unity, magnificence, and artistic effort, and this in turn ended by revolt or progress, and later speedy decline or abandonment.

We have determined fairly well when this movement affected each city and for how long. At Piedras Negras it began after 9.12.10.0.0 and before 9.12.15.0.0, and was ended at least by 9.18.0.0.0. At Copan it began after altar K, 9.12.16.7.8 and before 9.13.0.0.0, and ended by 9.16.5.0.0, being then succeeded by a new movement either of revolt or progress. At Quirigua it began with the city and ended by 9.16.10.0.0, being succeeded by a movement which lasted until 9.18.0.0.0, when it in turn was succeeded by something else. At Naranjo it began surely by 9.13.10.0.0 and probably somewhat earlier, and was apparently ended by 9.17.15.0.0. At Yaxchilan it probably began as at Piedras Negras by 9.12.15.0.0, but we have no proof before 9.13.17.12.10, nor have we any evidence when it ceased, lacking legible inscriptions after 9.16.10.0.0. At Palenque it apparently began after 9.12.6.5.8 and before 9.13.0.0.0, but we know nothing of its future history there.

We do not know the nature of the unifying influence. Was it intellectual, led by astronomers, or religious under the prestige of a Pope Gregory, or political by force of arms? Only political power and possibly conquest would seem adequate to effect such complete unification in less than ten years, as well as to account for the subsequent revolt beginning at the most remote points. Up to 9.12.10.0.0 no city was using the standard lunar calendar so far as we know; by 9.13.0.0.0, less than ten years later, we can find no city that was not using it. Did the movement originate in Palenque, or were Palenque and Piedras Negras simply the first cities in the path of an impulse coming from the northwest?

What other traits can be traced in company with the calendar? What of new appears at Piedras Negras in 9.12.15.0.0 that was

never there before? What new impulse do we find reaching Copan by 9.13.0.0.0, and is it followed by another impulse of different nature in 9.16.5.0.0, or do we see only progress with no real break? The changes of lunar calendar shown above may furnish us a structural framework into which other variations may be fitted until the history of the people finally appears, but for the moment the chief result is to suggest a lot of questions and lines of investigation.

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MAYAN TIME SYSTEMS AND TIME SYMBOLS

By CYRUS THOMAS

That the discovery by Mr J. T. Goodman[1] of the signification of certain time and numeral symbols in the Mayan inscriptions, coupled with the discoveries by Dr Förstemann in reference to time counting and also time symbols, must point out and open new channels in the investigation of Mayan hieroglyphics, is evident. The determination of characters which had previously received widely different interpretations must cancel a number of previous speculations, and the discoveries must largely influence future attempts toward interpretation of the inscriptions and codices. While Mr Goodman's ungenerous treatment of co-workers in the same field—ignoring entirely the work they had done, though often appropriating it and building thereon—is calculated to give his monograph an unfavorable reception; and although some of his assumed discoveries must be rejected as lacking proof and his leading theory discarded as untenable, the new light he has thrown on the subject by his real discoveries, when added to that from Dr Förstemann's investigations, will penetrate the mysteries of the inscriptions and possibly also of the codices. The writer may be permitted to say that he makes this assertion after careful investigation, during which he has tested, one by one, Goodman's renderings by reference to the originals as given in Maudslay's excellent photographic reproductions and drawings, accepting only those sustained by absolute demonstration.

The discoveries mentioned consist chiefly in ascertaining the fact that the time periods or orders of units, which are indicated in

[1] *Archaic Maya Inscriptions;* Maudslay's *Biologia Centrali-Americana*, pt. VIII.

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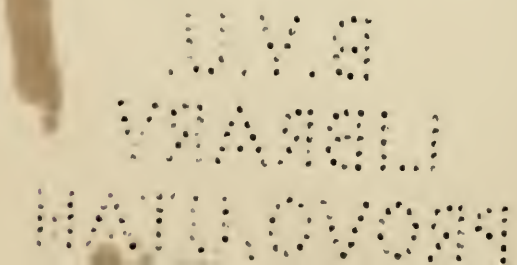
the Dresden codex by the relative positions of the numerals, or counters, are indicated in the inscriptions by special symbols. It is well known that among the Mayan tribes the vigesimal system was in vogue, and that to express numbers up to 19 (that is, units of the first or lowest order), they used dots and short lines; but to express units of the higher orders the authors of the codices (at least of the Dresden codex) had recourse to relative position. For example, to indicate 5 units of the first order, 4 of the second, 11 of the third, and 6 of the fourth, they placed them one above another, thus:

Fourth order	6 =	28,800
Third order	11 =	3,960
Second order	4 =	80
First order	5 =	5
		32,845

— twenty of the first order making one of the second, 18 of the second one of the third, 20 of the third one of the fourth, and so on; the number of the second order to make one of the third having been changed in time counting from the regular vigesimal order to 18, apparently to conform to the number of months in a year and thus to facilitate counting. It is apparent, therefore, that the value of one unit of each of the different orders in time counts was as follows, the day being the primary unit:

First order	1 day
Second order	20 days
Third order	360 days
Fourth order	7,200 days
Fifth order	144,000 days

Now, Mr Goodman has discovered that in the inscriptions the orders of units (or real time periods as he believes them to be) were indicated not by relative position, but by specific characters. To these orders of units (or time periods, as he terms them) he



has applied (except the first) arbitrary names, as follows: To the first or lowest, day or *kin;* to the second, *chuen;* to the third, *ahau;* to the fourth, *katun;* to the fifth, *cycle;* and to the sixth, *great cycle;* each having its symbol.[1]

Mr Goodman has further discovered that in the inscriptions a date is frequently followed by a number series and this by another date, and that, as in the codices, this intervening number indicates exactly the lapse of time from one of the given dates to the other. As this, when several times repeated with different dates and different numbers, amounts to actual demonstration, we are compelled to accept his claimed discoveries as real, so far as thus proven. As I have presented in detail, in a paper now in course of preparation, the data verifying these discoveries so far as the data afford demonstration, a simple statement of the fact must suffice here.

Although credit is due chiefly to Dr Förstemann for demonstrating the method of expressing high numbers in the Dresden codex, which has been followed with further evidence by the writer, I may note in passing that we seem to have overlooked the fact of the near approach of this method to that of the

[1] Although we speak of this discovery as Mr Goodman's, yet we would do Dr Förstemann injustice if we should overlook the fact that part of the credit is due to him. Not only had he discovered and applied to the time series in the Dresden codex the orders of units accepted and used by Mr Goodman, but in fact had determined as early as 1891 the value of the symbols designated *ahau* and *katun* by Mr Goodman, as appears from his article "*Zur Maya-Chronologie*" in the *Zeitschrift für Ethnologie* for that year. Mr Goodman's paper was not published until 1897, although it appears from his preface that it was completed in 1895. If Dr Förstemann had not seen Mr Goodman's paper when his article titled "*Die Kreuzinschrift von Palenque*," was published in *Globus* in 1897, and it makes no reference to the former, it is evident that he had discovered independently the value of the symbols which Mr Goodman designates *chuen* and *cycle*. It is evident also from the figures (numbers) he gives in his "*Zur Entzifferung der Mayahandschriften*," IV. (1894), that Dr Förstemann had discovered as early as June, 1894, the value of most if not all the five time-period symbols, as these figures are based on the series found on the stelæ and altars at Copan, as given by Maudslay. To the 360-day period Förstemann applied the name "old year," and to the 7200-day period the name "old *ahau*"; but he failed to discover their use. The chief credit therefore for this important discovery should be given to Mr Goodman.

ordinary decimal system of the present day, which has been suggested — though not expressly dwelt on therein — by reading Professor McGee's able paper on *The Beginning of Mathematics*[1]; in the one, as in the old Babylonian notation, it is by steps upward, in the other by steps to the left.

One important result of Mr Goodman's discovery is the evidence it furnishes of the strong similarity, if not absolute identity, of the time systems or calendars of the different Mayan tribes. To call attention to this point is the chief object of this paper. By means of his discovery we are enabled to determine positively the dates where the symbol is obscure or doubtful, and the numeral or time-period symbols where they vary from the typical forms. It was in this way that the advance in the interpretation of the time and numeral symbols of the Dresden codex was made and the explanation of their use and office was given.

The names and order of the days of the month given for the Maya (i. e., the Maya proper, or Yucatecs) and the Tzental and Quiche-Cakchiquel tribes, as based on historical evidence, are as follows:

Maya	Tzental	Quiche-Cakchiquel	Maya	Tzental	Quiche-Cakchiquel
1. Imix	Imox	Imox	11. Chuen	Batz	Batz
2. Ik	Igh	*Ik*	12. Eb	Euob	*Ee*
3. Akbal	*Votan*	Akbal	13. Ben	*Been*	Ah
4. *Kan*	Ghanan	Kat	14. *Ix*	Hix	Balam
5. Chicchan	Abagh	Can	15. Men	Tziquin	Tziquin
6. Cimi	Tox	Camey	16. Cib	Chabin	Ahmak
7. Manik	Moxic	*Quch*	17. Caban	Chic	*Noh*
8. Lamat	*Lambat*	Canel	18. Ezanab	*Chinax*	Tihax
9. *Muluc*	Molo	Toh	19. *Cauac*	Cahogh	Cooc
10. Oc	Elab	Tzi	20. Ahau	Aghaual	Hunahpu

The names in italics are the supposed dominical days in the calendars of the different tribes. That the dominical days of the Troano codex, which is generally attributed to the Maya of

[1] *American Anthropologist* (N. S.)., vol. 1, October, 1899.

Yucatan, were *Kan*, *Muluc*, *Ix*, and *Cauac*, is conceded; and that those of the Dresden codex, which are known to correspond with those of the inscriptions at Palenque, were *Akbal*, *Lamat*, *Ben*, and *Ezanab*, is also admitted. Goodman, it is true, shifts the initial day, but his method of counting gives the same result. It is seen, however, by reference to the list, that the three calendars, according to the historical evidence, begin the years with different days, it being assumed that the names opposite one another in the lists are equivalents so far as relative position in the series is concerned. Although the parallel names (names occupying the same relative position) differ considerably from the standpoint of morphology, some are but equivalents (as to signification) in the different tribal dialects; but this does not apply to all, as is evident from the efforts of Drs Brinton and Seler to bring them into harmony.[1] *Imix* and *Imox*, *Ik* and *Igh*, *Kan* and *Ghanan*, *Cimi* and *Camey*, *Lamat* and *Lambat*, *Muluc* and *Molo*, *Ix* and *Hix*; *Eb*, *Euob*, and *Ee*; *Cauac*, *Cahogh*, and *Cooc*; and *Ahau* and *Aghaual*, are merely different forms of the same names. But this cannot be said of *Votan* and *Akbal*, *Kan* and *Kat*, nor of most of the other corresponding names.

Turning now to the codices and inscriptions, let us compare the days as represented symbolically in the different sections where found. Of course we cannot say positively to what tribes or to the ancestors of what tribes the inscriptions in the ruins of the different sections are respectively to be attributed. All we can assert positively is that they are Mayan; that those of Palenque are in what is or was the country of the Tzental and Zotzil; those at Menche (or Lorillard city) in the country of the Lacandon; those at Copan and Quirigua in the country of the Quiche and Cakchiquel; and those at Tikal in the country formerly occupied by the Itzae. Nor can we say that uniformity in the form of the day symbols proves positive identity in the names, allowing

[1] See also the writer's paper *Day Symbols of the Maya Year* in the Sixteenth Ann. Rep. Bur. Am. Ethnology (1897).

for the variation necessary to express the same idea in the different tribal dialects; nevertheless it tends in this direction, and undoubtedly indicates unity of origin.

That there are in the inscriptions forms of some of the day and month symbols and peculiarities in other characters not observed in the codices is true. But considering what has been stated by early writers as to the names and order of the days and months among the different tribes, the agreement in the forms of the symbols and in the order of the days and months in the inscriptions is remarkable. Take, for example, the day *Ahau;* although we meet here and there with a face form, the usual symbol at Palenque, Tikal, Menche, and Copan is the same as that found in all the codices. The same is true of the symbols for the days *Ik*, *Akbal*, *Kan*, *Ben*, *Ezanab*, *Lamat*, *Chuen*, and one or two others. *Cimi* and *Caban* vary slightly from the typical form; *Muluc*, *Eb*, *Men*, and *Ix* are of rare occurrence in the inscriptions. Another fact which has an important bearing in the comparison of systems is that each holds its relative position throughout the series in precisely the same order as in the Dresden codex. There is no known variation from this rule. Not only so, but the proof is clear that the years are counted from the same dominical days. For example, we find *Ahau* occurring on the 3d, 8th, 13th, and 18th of the month; *Akbal* on the 1st, 6th, 11th, and 16th, which can be true only when *Akbal*, *Lamat*, *Ben*, and *Ezanab* are the dominical days or year-bearers.

Concerning the question as to how far the similarity in the form of the day symbols can be taken as an indication of a similarity in the names, the following facts are noted: The day *Votan* in the Tzental calendar stands in the place of *Akbal* in the other calendars. Now, *akbal*, in both Maya and Cakchiquel, signifies "darkness," "night," and "to grow dark," or "become night"; while *Votan* is the name of a hero-god formerly much venerated by the Tzentals. *Votan* or *uotan* is supposed to signify "heart" in the Tzental dialect, and according to Nuñez de la

Vega he was called "The Heart of the Nation." Yet the symbol of this day is remarkably uniform in the Dresden codex and in all the inscriptions where it appears. The same is true of *Kan*, *Lamat*, and *Ezanab*, which never appear as face characters. As it is admitted that *Votan* is not equivalent to *Akbal*, its corresponding name, *Kat* to *Kan*, nor *Canel* to *Lamat*, how are we to account for the uniformity in the symbols of these days in the several regions which the tribes mentioned are known to have inhabited?

However, the widest variation between the historical evidence and that of the inscriptions is in reference to the names of the months. In regard to these, as given historically, it may be stated that those of the Maya (proper) and the Tzental-Zotzil and Quiche-Cakchiquel groups differed throughout morphologically and in signification, so far as the latter has been determined, no name in one, with a single exception, being the same as that in another. As compared with those in the Maya calendar, which are —

1. Pop	7. Yaxkin	13. Mac
2. Uo	8. Mol	14. Kankin
3. Zip	9. Chen	15. Moan
4. Zotz	10. Yax	16. Pax
5. Tzec	11. Zac	17. Kayab
6. Xul	12. Ceh	18. Cumhu

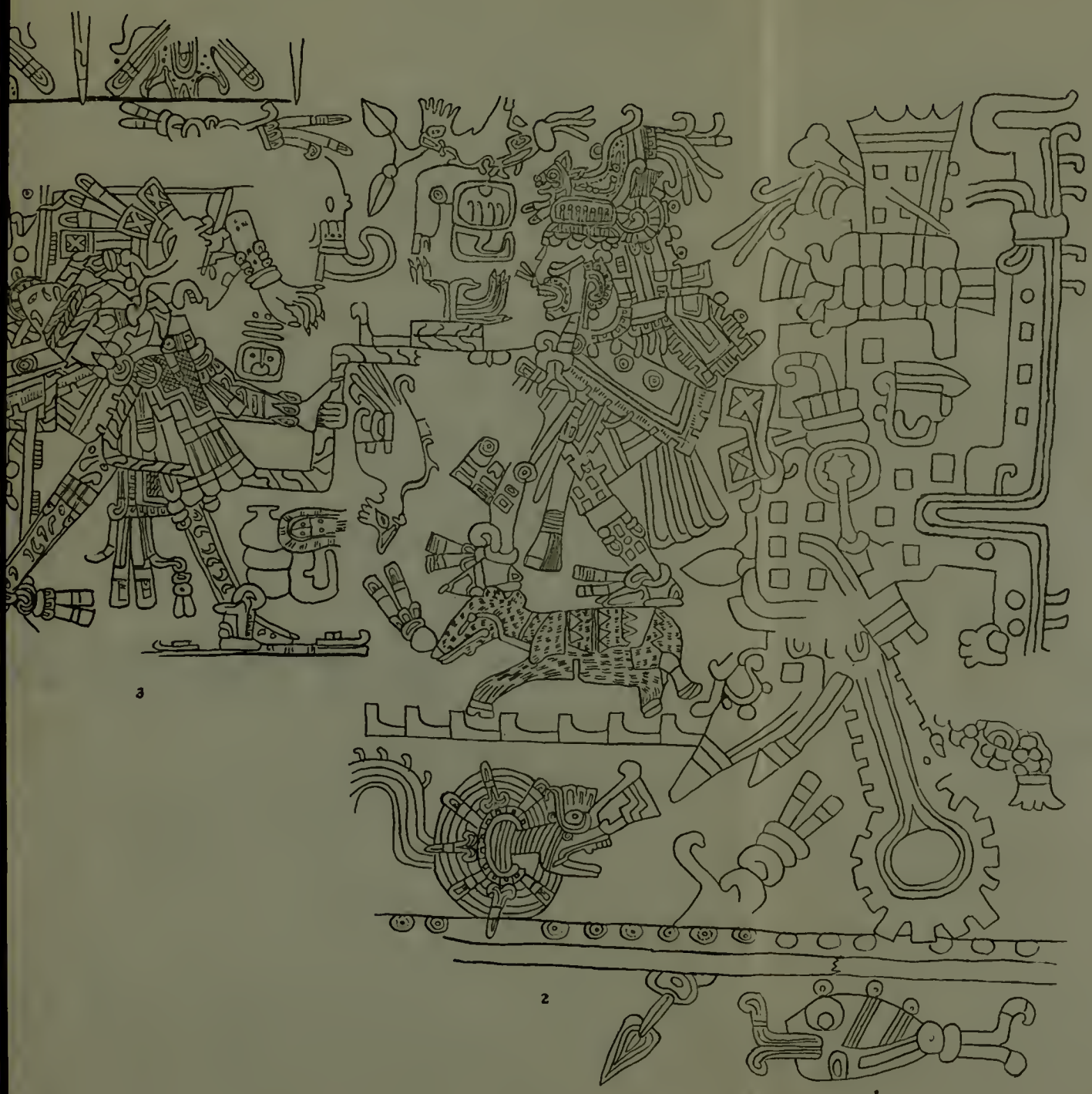
those of the Tzental were 1 *Tzum*, 2 *Batzal*, 3 *Si sac*, etc.; those of the Quiche, 1 *Tequexepual*, 2 *Tziba pop*, 3 *Zac*, 4 *Ch'ab*, etc., differing in like manner throughout. So widely different, in fact, are they, that Drs Brinton and Seler made no attempt to bring them into harmony. In fact Dr Brinton says: "While the names of the twenty days of each month are practically identical in all the five languages [including Zapotec and Nahuatl] under consideration, the reverse is the case in the names of the eighteen months which made up the vague solar year. These differ widely

in tribes very closely related, as the Quiches and Cakchiquels; and even in the same dialectic area, as among the Nahuas."

Now, in contrast with this the symbols are not only comparatively uniform in the inscriptions, as shown by the figures given in Mr Goodman's work and in Maudslay's photographs, but with very few exceptions they correspond with those in the Dresden codex. There are also indications that the names were the same as found in the Maya calendar. For example, the symbol of the month *Pop* is characterized by an interlacing figure apparently intended to denote matting; in Maya *pop* signifies "mat." The name of the 4th month, *Zotz*, signifies "a bat," and the symbol, which is always a face form, has an extension upward from the tip of the nose presumably to indicate the leaf-nose bat. But as conclusive evidence on this point, if Mr Goodman is correct in his interpretation, the month is designated on one of the stelæ at Copan by the full form of a leaf-nose bat. So general is the uniformity of the month glyphs, in both the Dresden codex and the inscriptions, that Mr Goodman has not hesitated to apply the names as given in the Maya calendar, and to place side by side those of the inscriptions with those of the codex. "There is not," he says, "an instance of diversity in all their calendars; their dates are all correlative, and in most of the records parallel each other." Of course there are sporadic variations and imperfect glyphs which often render determination by simple inspection uncertain, but this is generally aided by the connecting numeral series.

The change of day symbols from the typical form to face characters is found in the codices as well as in the inscriptions, as is shown by an examination of the Troano codex, where this is of frequent occurrence. The occasional variations of the symbols for the days *Chicchan*, *Cimi*, and *Ix*, in the latter codex, are so radical that identity is ascertained only by means of the positions they occupy in series. It is chiefly on this uniformity that Mr Goodman bases his theory of an archaic calendar.

Another item in the evidence is found in the identity in form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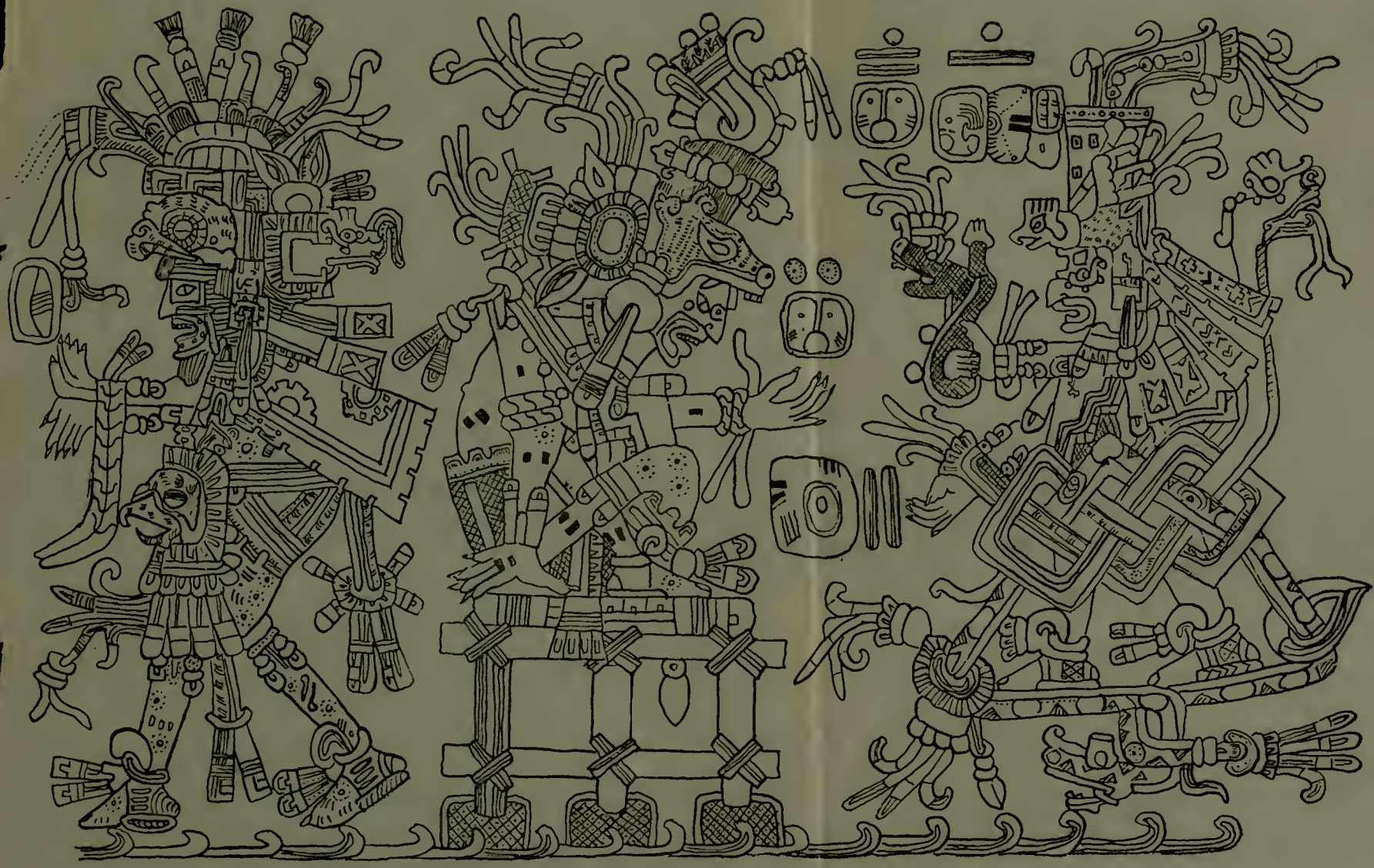

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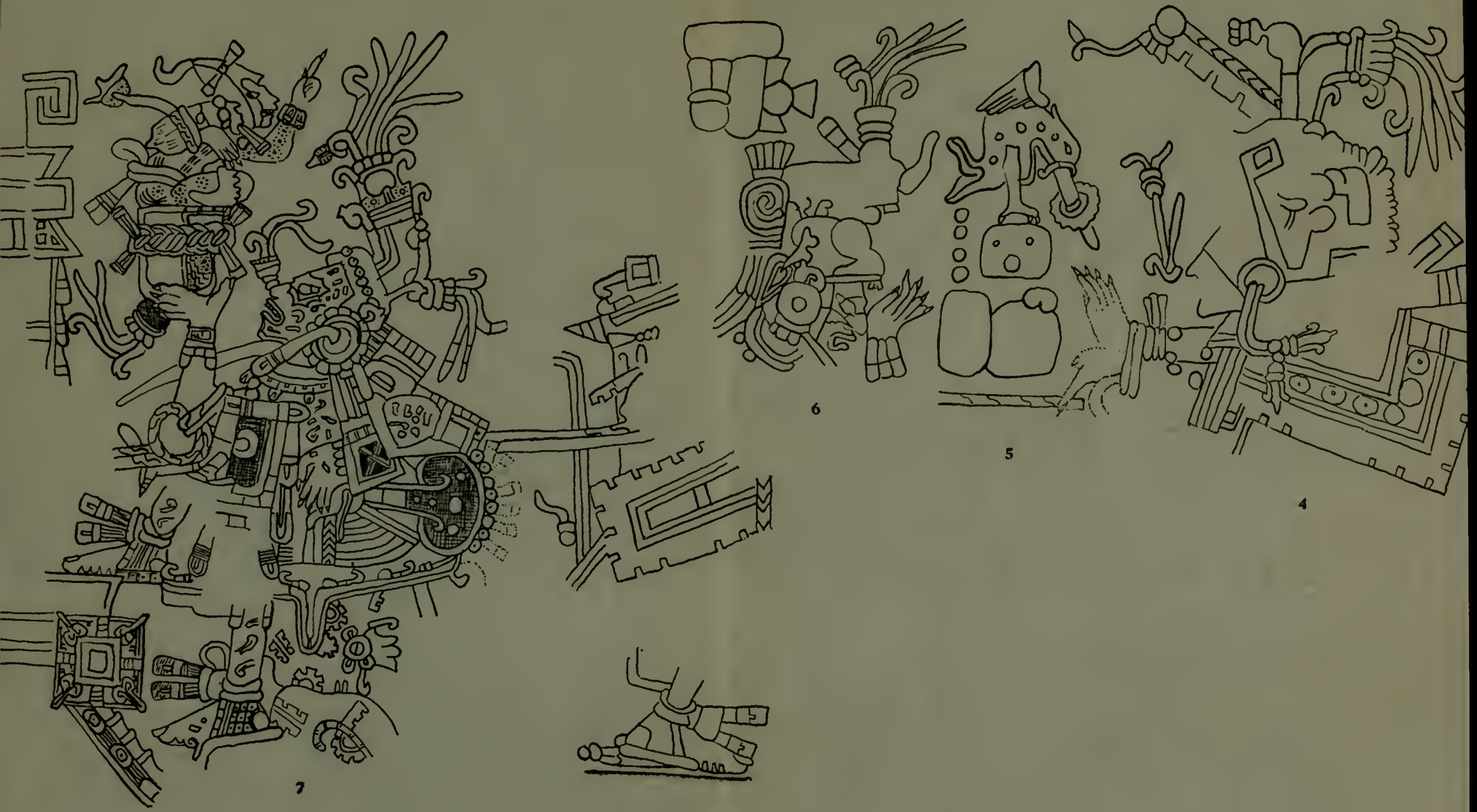


PAINTED STUCCO ON WESTERN HALF OF NORTH WALL, MOUND 1, SANTA RITA. (AFTER GANN)

ZODIACAL INSCRIPTION AT SANTA RITA. (AFTER GANN)

of the time-period symbols or symbols denoting the orders of units. Though face forms are frequently introduced, the typical forms are the same in the inscriptions of each section, and the face characters are used in each. In addition to the localities mentioned, one or two of the former are found in the inscription on a tablet from Tonina, Chiapas; on an amulet from Ococingo, Chiapas; and on a vase from a Quiche tomb, Guatemala; and at least three of the typical forms are found in the Dresden codex.

We therefore have as evidence on this point the similarity in form of the day, month, and numeral symbols; the uniformity in the order in which the days and months follow one another; the use throughout (except by the Maya of Yucatan) of the same days as dominicals or year-bearers; and in fact, throughout, precisely the same time system and the same method of representing graphically its several features. In addition we find represented in the inscriptions of each locality what Maudslay has appropriately termed "initial series," beginning with a large or quadruple glyph, as that with which the inscription on the Tablet of the Cross at Palenque begins (in the upper left-hand corner of the left slab), and also the same order in placing the glyphs with reference one to another; that is, all are to be read in the same direction. These facts, therefore, indicate much closer uniformity in the time systems of the different sections than that inferred from the historical evidence.

What is the deduction to be drawn from the above-mentioned facts? Is Goodman right when he says: "From this is deducible the important fact that — whether a single empire, a federation, or separate nations — they were a homogeneous people, constituting the grandest native civilization in the Western Hemisphere of which there is any record"? In other words, do they not show that when the inscriptions were chiseled the Mayan group was much more homogeneous and the tribal distinctions far less marked than when the Spaniards arrived on the scene? Dr

Brinton [1] says that "in all the Mayan dialects the names [of the days] belonged already at the time of the Conquest to an archaic form of speech, indicating that they were derived from some common ancient stock, not one from the other, and that, with one or two possible exceptions, they belong to the stock and are not borrowed words." The inscriptions seem to go far toward confirming this view, which was based wholly on linguistic evidence, although the opinion would imply either that the Maya of Yucatan are to be regarded as the older division of the Mayan group (excepting the Huasteca), or that they had retained, with less change than other tribes, the original names of the days and months.

If the view herein reached be accepted as well founded, the inscriptions and codices will form in this respect a fixed basis for further research into the history of the Mayan tribes. The next step will be to determine from these records, if possible, the probable age of the inscriptions, for, as appears from what has been shown, the history as derived from the early Spanish writers cannot be fully relied on; and the traditions can only be trusted so far as they agree with the monuments and the linguistic evidence. That Mr Goodman's conclusion in this respect cannot be accepted is evident from the quotation given in a previous communication to this journal. [2]

As will be seen, I have limited this paper to a very brief summary of what may be called one branch of the mathematical evidence. To exhaust it would require a comparison of the number and calendar systems of the Mexican codices. Nor have I broached the mystical use of time periods and numerals by the Maya and Nahua, both of which must have an important bearing on the subject treated.

[1] *Native Calendar*, p. 21.

[2] *American Anthropologist*, N. S., vol. 1, p. 559.

M. C.
Dr. C. V. Carlson
from Dr. D. G. Brinton
1892

DES SIGNES

DE

NUMÉRATION EN MAYA

PAR

H. DE CHARENCEY

ALENÇON
E. RENAUT-DE BROISE, Imprimeur et Lithographe.
PLACE D'ARMES.

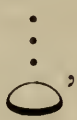
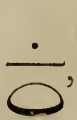
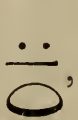
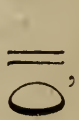
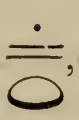
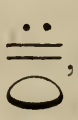
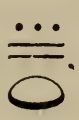
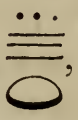
1881

DES SIGNES

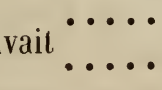
DE

NUMÉRATION EN MAYA

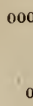
On sait que les chiffres Mayas s'exprimaient au moyen de points et de barres. Les unités jusqu'à 5 exclusivement se trouvaient marquées par autant de points, d'ordinaire placés les uns au bout des autres; ainsi . pour 1, . . pour 2, ... pour 3. Parfois, on les disposait en carré, ex. : ⁚ pour 4, mais cela ne paraît point avoir été l'usage le plus fréquent. En général, ils se trouvaient placés sur une seule ligne, de la façon suivante .... pour 4. Une barre — signifiait 5, et deux barres tantôt superposées =, tantôt redressées verticalement ||, marquaient le nombre 10. Les nombres supérieurs à 20 se marquaient en accolant le nombre de points voulus auxdites barres; ex : ⁝ pour 13, ⁚ || pour 12. C'est par le même procédé que l'on indiquait les nombres de 5 à 10 exclusivement; ex : ⁝ | pour 9. Trois barres, soit couchées, soit droites, mais toujours parallèles, voulaient dire 15. Des points indiquaient les unités jusqu'à 20; ex. : ⁝ ||| pour 19. Nous avons longtemps ignoré comment s'écrivait le nombre 20 et nous nous figurions que

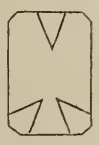
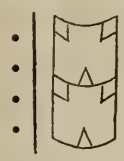
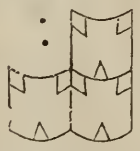
peut-être il ne se trouve réellement pas une seule fois exprimé dans le *Codex Troano*. Cela nous paraissait tenir à ce que ces signes numériques ne sont usités dans le manuscrit en question que pour marquer les jours du mois. Or, le calendrier Toltèque en vigueur chez toutes les populations policées de la Nouvelle-Espagne ne connaissait que des mois de 20 jours. N'oublions point en effet que, suivant toutes les apparences, ledit *Codex Troano* constitue un simple calendrier. De nouvelles recherches nous ont amené à reconnaître l'hiéroglyphe du nombre 20, dans ces espèces de cachets ou agraffes de la forme suivante que le manuscrit nous présente plusieurs fois et toujours accolés à des signes numériques d'ordinaire, mais non constamment placés au-dessous d'eux. D'ailleurs, lesdits cachets constituent avec les caractères incontestablement numériques, les seuls parfois écrits à l'encre rouge. Tous les autres le sont invariablement en noir. Dans cette hypothèse, que nous ne pouvons nous dispenser d'admettre, se devra lire 22; , ou  , 23;  , 26;  , 27;  , 30;  , 31;  , 32;  , 33;  , 38; , 39. Du reste, il n'y a qu'à la première page du manuscrit que figurent ces cachets et nous ignorons pour quel motif on les a parfois, ainsi que les signes numériques, peints en rouge. En tout cas, cet usage de faire du 5 une sorte de tête de numération, en le représentant par un signe différent de ceux qui entrent dans la composition des 4 unités précédentes, semble assez remarquable. Les inventeurs de l'écriture calculiforme avaient-ils donc deviné le caractère primitivement quinaire du système de numération propre à leur langue? Certes, il avait déjà cessé de l'être, depuis bien des siècles, au moment où fut inventée l'écriture Yucatèque, mais il le fut sans doute à l'origine. Ce

qui le prouve, c'est qu'il est resté jusqu'à aujourd'hui, en Maya, comme dans tous les dialectes congénères, vigésimal. Ainsi, le Maya dit *Hunkal* (litt. *Kal* ou 1 agraffe) pour 20; *Lahucakal* (litt. 10 et 1 agraffe) pour 30; et *Cakal* litt. (2 agraffes) pour 40, et ainsi de suite.

Peut-être conviendrait-il de voir plutôt en tout ceci la preuve que le mode graphique d'exprimer les nombres a été inspiré aux peuples du Yucatan par une nation à système numéral franchement quinaire, telle qu'étaient les Mexicains. En effet, quelques traits de ressemblance paraissent se pouvoir découvrir entre le système de numération écrite des deux peuples. Celui des Mexicains, en tout cas, paraîtrait plus primitif et le système Maya n'en serait, pour ainsi dire, qu'un perfectionnement. Cela est d'autant plus étrange que, dans son ensemble, le mode d'écriture Maya semble bien original et n'a pu être inventé que chez un peuple parlant déjà la langue Yucatèque. Rien n'empêcherait, en tout cas, de supposer qu'avant l'invention d'une méthode régulière de transcription des mots, les anciennes populations de la Nouvelle-Espagne faisaient usage d'une numération quinaire, connaissaient déjà quelque moyen de peindre les nombres. Plus tard, leurs procédés auront été communiqués à la fois aux Mexicains et aux Yucatèques, qui les auront plus ou moins perfectionnés. Quoiqu'il en soit, d'après Fabregat, les nombres de 1 à 10, se rendaient en Mexicain, au moyen de points; p. ex. : . pour 1, : pour 2, ∴ pour 3, ... pour 4. A partir de 6 inclusivement, ou *Chica-cé*, litt. † I (sous entendu 5), un ou plusieurs points se trouvaient placés au-dessus des 5 premiers, de la façon suivante . Pour 10, l'on avait  ou .

Il était tout naturel que le caractère franchement quinaire de la numération Mexicaine conduisît à un pareil mode de transcription. En tous cas, dans certains manuscrits Mexicains, et spécialement dans le *Codex Telleriano-Remensis*, on retrouve un mode de rangement des cercles ou points numériques assez

analogue à celui qu'indique Fabregat. On les divise en séries ordinairement de 5, du moins pour les nombres supérieurs à 9 et l'on a p. ex. : pour 9; pour 10; pour 11; pour 12;  pour 13. Il est vrai que pour 5, on voit, d'après le *Telleriano-Remensis* ; pour 7, et pour 8. Il n'en est pas moins vrai que dès qu'il s'agissait de nombres tant soit peu élevés, l'on trouvait les chiffres rangés pour ainsi dire par grappes de 5, les unités complémentaires seules formant des groupes d'une quantité moindre de points. Admettons que les Mayas qui déjà avaient reçu des nations du Nord leur système de calendrier, leur aient emprunté également leur système graphique, ils devaient presque forcément se trouver amenés à remplacer dans l'écriture courante, la grappe de 5 boules par une barre, les points restant affectés aux seules unités inférieures à 5. Tout le monde, sans doute, s'accordera à considérer une telle façon de voir, pour le moins fort admissible, d'autant plus que les Mexicains auraient, paraît-il, quelquefois fait de même. Par exemple, nous ne découvrons pas trop d'analogie de forme à établir entre *pantli* ou « l'étendard », hiéroglyphe du nombre 20, *cempohualli* (litt. un compte) en Mexicain et le Maya qui indique un *kal* ou agraffe. Enfin, nous ne saurions dire quel motif poussa les rédacteurs du *Codex Troano* à peindre leurs chiffres tantôt en rouge, tantôt en noir. Dans le *Codex Telleriano-Remensis*, nous trouvons les cercles numériques marqués aussi par différentes couleurs, jaune, violet, vert, bleu et orange. Par exemple en Maya, comme en Mexicain, la couleur ne peut varier pour les éléments d'un seul et même nombre; ces teintes, au moins, dans le manuscrit Aztèque, ne semblent avoir aucun rapport

avec le caractère faste ou néfaste des jours auxquels les chiffres se rapportent. Nous ne saurions dire s'il en est de même pour le *Codex Troano*. Il nous paraît également difficile de contester le caractère numérique du signe  qui apparaît plusieurs fois à la première page du *Codex Troano*. Il est accompagné d'autres chiffres et se compose de 3 points ou crochets. Nous le transcrirons donc par 60, puisqu'en Maya, ce nombre se disait *ox kal*, litt. : trois crochets ou agraffes. Il conviendra d'interpréter  par 129;  par 182, et ainsi de suite. Cela posé, nous pouvons déjà déchiffrer une partie importante de la dernière page (première dans la publication de M. l'abbé Brasseur) du *Troano*, la portion concernant les jours du mois et signes numériques.

	IMIX —	IK — 2	ACBAL — 3	KAN — 4	CHICCHAN — 5	CIMI — 6	MANIK — 7
Chiffres à l'encre rouge.							
Chiffres à l'encre noire.	135	182	136	129	135	182	139
Chiffres à l'encre noire.	242 ou 222	252	244	243 ?	251	242 ou 182 ?	123 ?
Chiffres à l'encre rouge.	33	23	27	31	22	26	30
Chiffres à l'encre rouge.	39	23	23	32	31	27	38

H. DE CHARENCEY.

Alençon. E. Renaut-De Broise, imp.

To Mr. William C. Pa
With the compliments & congratulation
J. Martinez H.
Merid, Sep 5/1912

COMPTE-RENDU
DEL XVIII CONGRESO
INTERNACIONAL,
DE AMERICANISTAS
VERIFICADO EN LÓNDRES
EN MAYO DE 1912.

La Creación del Mundo según los mayas. Páginas inéditas del M. S. de Chumayel

POR JUAN MARTÍNEZ HERNÁNDEZ,

MERIDA.—MEXICO.
Imprenta de Luis Rosado Vega.

PRÓLOGO.

SEÑORES:

OCUPÁBASE D. Juan Pío Pérez el año de 1837, en copiar un calendario maya que halló en el pueblo de Ixil, de la misma clase de otros que solía encontrar y que son conocidos de vosotros por el nombre de Libros de Chilam Balam, cuando se dió cuenta en dicho cuaderno de la existencia de una vieja historia, que él creyó ser "traducción sacada de la Biblia sobre la creación del mundo." No dándole importancia, se abstuvo de trasladarla.

El Obispo de Yucatán, Carrillo y Ancona, al hacer este comentario en 1872 (1), lamentábase de que Pío Pérez se hubiese abstenido de copiarla. No advirtió que en el manuscrito del pueblo de Chumayel hallado y conservado cuidadosamente por él, y á fojas 24 á 27, se hallaba este raro documento, el mismo quizás omitido por Pío Pérez, aunque no sacado de la Biblia, sino como tradición del más puro origen gentílico.

Por esta época se hallaba en Yucatán el malogrado lingüista Dr. Cárlos Hermann Berendt, amigo muy estimado del Obispo, por cuyo motivo pudo obtener de él, permiso incon-

(1) Disertación acerca de la historia de la lengua maya ó yucateca.—Boletín de la Sociedad de Geografía y Estadística. México, 1872.

dicional para sacar, como lo hizo, copias facsímiles de todos los manuscritos de su colección. Tampoco advirtió Berendt su contenido.

La muerte prematura de este laborioso filólogo, dió lugar á la compra que verificó el Dr. Brinton de todos sus valiosos libros y apuntes. No se apercibió este célebre americanista de su existencia, porque al ocuparse de la materia dijo: "nada sabemos prácticamente de la cosmogonía maya. . . . . hasta hoy no ha podido comprenderse la concepción cósmica de los antiguos mayas" (1).

El Dr. Schellhas no tuvo mayor fortuna, y en realidad cuantos se ocuparon de la materia y cuantos tuvieron en sus manos y leyeron el manuscrito. La mitología maya quedó circunscrita á los informes que el P. Hernández proporcionó al P. Las Casas y á lo contenido en las obras de Landa, Herrera, Sánchez de Aguilar y Cogolludo.

Es evidente que escritos de esta índole existieron en la época de la conquista. Según Cogolludo, "tenían fábulas muy perjudiciales acerca de la creación del mundo, y algunos después que supieron, las hicieron escribir y guardaban, aun ya cristianizados y bautizados, y las leían en sus juntas" (2).

Este curioso apunte que viene á llenar un vacío, lo hemos hallado en la página 24 del MS. de Chumayel y es el que hoy presentamos á este XVIII Congreso Internacional de Americanistas, transcribiéndolo íntegro, y traduciendo su principio únicamente, por la brevedad que exige vuestro reglamento.

Por lo que se refiere al texto, vereis en él, señores, el mismo conflicto entre dos deidades tan peculiar de las religiones americanas, observado por el Dr. Brinton, con la diferencia que, según los mayas, esta lucha se verifica entre dos deidades numerales pluralizadas: *Bolon-ti-ku*, nueve dioses, vence á *Oxlahun-ti-ku*, trece dioses; toma los elementos creadores, elévase á las altas regiones y da lugar á la formación del mundo; son creadas las mujeres que no tienen padres, *ix-mayumob;* que sin tener esposos, *ix-ma-[illegible]mob*, dieron vida á los *ah-núm-yaob*, simbolizando así á la humanidad, condenada perpetuamente á los sufrimientos y al trabajo. Son creados los cuatro

(1) A Primer of Mayan Hieroglyphics, Philadelphia, pag. 47.
(2) Cogolludo, Historia de Yucatán, Lib. IV, Cap. VI.

ix-ma-ichamob (that had no husbands)
ix-ma-yum-ob (" " fathers)

dioses, los *bac-cab*, ~~huesos~~ del mundo, quienes lo destruyen, lo reconstruyen y se ocupan en sostener el cielo para que no caiga; se verifica el robo del dragón ó serpiente con plumas que simboliza el descubrimiento de la ciencia astronómica; sobreviene la destrucción universal por el diluvio; *Itzam-kab-ain*, la ballena con pies de lagarto, mamífero acuático con aptitudes de reptil, es fecundada por *Ah-uuc-chek-nale*, el "siete veces fecundador," y se originan las especies todas. Este mitológico reptil, es el mismo "peje grande que es como caimán," á que se refiere el Codex Fuenleal (1), el *cipactli* azteca, primer día de su calendario como *ymix* lo es del maya.

A través del simbolismo se transparenta una concepción cósmica muy elevada, destacándose en el fondo el calendario, fruto sorprendente de observaciones atentas y prolongadas; la transición del cómputo del año de 360 días, al del año de 365 días, da lugar al nacimiento de esos cuatro dioses hermanos que sostienen eternamente la máquina celeste, y forman el pedestal de una religión que sin ser simple sabeismo, adoración del Dios de la Luz, como ha pretendido demostrar el Dr. Brinton (2), ó exclusivo culto numeral, como afirma Mr. J. T. Goodman (3), participa en realidad de esos elementos por el íntimo enlace que existe entre los astros y las matemáticas.

Es evidente que los mayas hicieron un culto de su calendario. Según Landa "quien esta cuenta de katunes ordenó, si fué el demonio, hizo lo que suele hordenándolo á su honor, ó si fué hombre, devió ser buen idólatra, porque con estos sus katunes, añadió, todos los principales engaños y agüeros y embaymientos con que aquesta gente anda, allende de sus miserias, del todo embaucada, y assi esta era la sciencia á que ellos davan más crédito, y la que tenían en más, y de la que no los sacerdotes todos sabían dar cuenta" (4).

El nombre de *Itzam* conque aun hoy día conocen los viejos pescadores á la ballena, explica sin ambigüedad el de *itzaes* que llevaron los mayas antes de la fundación de Mayapan, y el de *Itzam-ná* su pretendido civilizador primitivo, como *Votan* lo fué de Chiapas y Tabasco.

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(1) Historia de los mexicanos por sus pinturas. Nueva colección de documentos para la historia de México, tomo III, México, 1891.
(2) American Hero Myths, Philadelphia, 1882, pag. 230.
(3) The Archaic Maya Inscriptions, London, 1897, pag. 78.
(4) Landa, Relation des Choses, Paris, 1864, pag. 314.

Digno de estudio es este manuscrito, y admirable concepción cósmica, si se compara, despojada de sus envolturas simbólicas, con las más atrevidas ideas vertidas por los naturalistas y geólogos modernos, acerca de la formación del mundo, del origen del hombre y de las especies.

LA CREACION DEL MUNDO

SEGUN LOS MAYAS.

Páginas inéditas del MS. de Chumayel.

Página 24.

Ti hach kabet u bel yoczabal ti ol: lay u tunil tu ppatah cayum citbil; lay u kamchi lay baal-ché, licil ca tzicic uay con ahtepal uincob.

Hach paybentzil u kultabalob hahilob kuob, laobi tunob; cumlahi hahal ku cayumil ti *Dios*, u yumil cáan yetel lúum, hahal ku.

Bacacix yax kuobe, hauay kuob, ɔoc u than u kultabalob, kázpahiob tumen u *bendicion* u yumil cáan, ca ɔoci u lohol balcah, ca ɔoci u caput-cuxtal hahal ku, hahal *Dios*, ca u cici thantah cáan yetel lúum.

Ti kázpahi a kul, maya uinicexé!; xeth a uol ta kulex lae!

U kahlay cab tu kinil; lay tumen ɔiban lae; tumen ma kuchuc tu kin u meyah lay hunob lae, picil thanob lae. Utial u katabal u chi maya uinicob, ua yohelob bix zihanilob eɔlic cab uay ti peten lae.

* * *

Ti pet-an. (Un signo ó figura usual del ahau, borrado, significando que tiene el rostro vendado).

Ichil Buluc Ahau, tii ca hoki Ah-mucen-cab kaxic u uichob Oxlahun-ti-kú; maix yoheltahob u kaba, halilí u cic

yetel u mehenobe ; yalahob ti maix chacanhii u uich tiob xan. Tuchi-ix ca ɔoci yahalcabe, maix yoheltahob binil u lebal ; caix chuci Oxlahun-ti-kú tumenel Bolon-ti-kú ; tii ca emi kak, ca emi tab, ca emi tunich yetel ché ; ca tali u baxal ché yetel tunich; caix chuci Oxlahun-ti-ku, yetel caix paxi u pol, caix lahi u uich, caix túbabi, caix chuc-pach-hí xan ; caix cólabi u can-hel yetel u hol-zabac; ca chabi ix-kukil ix-yaxum; yetel ca chabi ybnel ppuyem uiil, yetel u puczikal ppuyem zicil, yetel ppuyen topp, yetel ppuyen buul. U teppah ínah yax Bolon-ɔa-cab, ca biní tu yoxlahun taz cáan ; caix tun cúlhi u maɔil yetel u ní u bac-lilí uay yokolcabe ; ca tun bin u puczikal tumenel Oxlahun-ti-ku ; maix yoltaheb binci u puczikal uiil lae; caix húlahi ix-mayumob yetel ah-numyaob ix-maíchamob, cuxanobix ti minan u puczikalob; caix muchahií tumen u yam zúuc tu yam kaknab; hun-uaɔ-háil hulom haa-il ; tii ca uchi col canhelilí; ti homocnac canal, homocnacix ti cab; ualic cantul-ti-ku, cantul ti bacab lay hayezob; tuchii tun ca ɔoci hay-cabil, lay cah-cunah uchebal ca tzolic kan-xib-yui ; ca ualhi zac-ymix-ché ti xaman; caix ualhí yocmal cáan ; u chicul hay-cabal lay zac-ymix-ché, ualic cuchi ; caix ualhi ek-ymix-ché culic ek tan piɔoy; caix ualhi kan-ymix-ché u chicul hay-cabal ; culic kan tan piɔoy, cumlicix kan-xib-yui, ix-kan-oyal-mut ; caix-ualhi yax-ymix-ché tu chumuc u kahlay hay-cabil ; culic, uatal, cumtal u cah u lac can ah-ual katun, ah-pay-kab, ah-pay-oc tu yum; cumtal u cah chac-piltec tu lakin cab ah-pay-oc tu-yum; cumtal u cah zac-piltec tu xaman cab ah-

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pay-oc tu yum ; cumtal u cah lahun-chan ah-pay-kab tu yum. "Hex u uol cab," ualic ah-uuc-chek-nale, "tali tu uuc taz cab;" ca emi u chékebte u pach ytzam-kab-ain ; tii ca emi tu muk u xuk lúum cáan, ximbal u cahob tu can cib tu can taz ti ek ; ma zazil cab ; ti hun-minán kin ; ti hun-minán ákab ; ti hun-minán u ; ah-ubahob, ti-ix tun u yahalcab ; ca tum ahi cab. (un signo que representa una cruz +). Ualacito yahal cab ; Oxlahum-pic-ɔac tu uuc u xocan yahal-cab; ca tun ah-cab tiob.

Ciuba ca-kin-ɔam, ox-kin-ɔam ; caix hoppi yokol Oxlahun-ti-ku ; okol u cahob ti yahaulil chacab tun tepal chac hix

pop, chac acan u yax chel cab ; chacan u nnmteil cab tumenelob uuc yol zip maix tu kin u tepal ; lay-lic yokticob Bolonti-ku lae ; tii ca tali u tzolol pop, chac cix pop culic Bolon-tiku ; zut-pol-bilin yit, ti culic tu pop ; ti ca émi zio, tali tanyol cáan, lay u zioil tepal, u zioil ahaulil.

Caix cumlahii chac eo ; ca cumlahi zac yeoebil, ahaulil eo ; ca cumlahi kan eo ; ca cumlahii chactenel ahau, ahten pop, ahten oam ; ca culhi zac-temal, ahten pop, ahten oam ; ca cumlahii ek-tenel ahau, ahten pop, ahten oam ; ca cumlahi kan-tenel ahau, ahten pop, ahten oam. Ti kuix tu than, ti uaix maix kui, ti minanix u uah, ti minanix yaal hun xeli.

Lic ualic u muluitic, maix tab u yabal ; lic u yancuntic, caal u mut, ti culic cal kin, caal numya ; ti tali tamuk yahaulil ca kuchi ; ti culic tu pop, top canal, hopan u kak, colop u uich kin, tocan ti cab ; lay u buc ti yahaulil ; lay u chun licil yoktic u tepal tu kin. Numen chuc, numen celem, tu kin u natal naat ahauob ; can ualic u chic ché, mol tu kin zatay babalilí ; can ualic u ché ah-muuc tn ho can be, tu ho can heleb, okom bul cum tu kinil ; momolii pepen ; ti tali chacmitun numya. Lic u talel ox uinkeh, u kin, ox-ahau katun, ox-tuc ti hab. Lay bin nupuc ichil ah-ox-ahau katun, ca bin cumlac u yanal katun ; ox u uah, ox yaal ; cup u uah, cup yaal ; la cu hantic, la cu yukic. Xbatun chichim chay cu hantic. Lay culhi uay tu cahal numyae yume ; ichil bolon tun, tu kin yan oulilí. Katal u cah u cuch katun, tu lah yabil ; ah-oxlahun ahau, tii ca u hekah yoc ah-buluc ahau ; tii ca emi u than Bolon oac-cab u ni-yak, ca emi katal u cah u cuch katun. Katun, bolonte u cuch ca emi ti caanil ; kanix u kinil kaxci u cuch ; tii ca emi haa, tali tan-yol cáan uchebal u caput-zihil Bolon-haaban yotoch ; yet emi Bolon-mayel ; chahuc u chí. u ni yak, chahuc-hi u oomel. Ti ca emi can-tul chaac, uaya caat lae ; lay u cabilob nicté lae ;

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tií ca hoki ix-chac-hoch-kom ; tí yetel ix-zac-hoch-kom ; ti yetel ix-ek-hoch-kom ; yetel ix- haunal ; yetel ix-huknab. Yet hoki tun ix-hóyal-nicté ; yetel ix-honix-té ; yetel ix-ninich-cacau ; yetel ix-chauil-tok ; yetel ix-bac-nicté ; yetel ix-macuil-xuchite ; ix-bolon-yol-nicté ; yetel ix-laul-nicté ; yetel kouol-yoktah-nicté. Lay hokob nicté, laobix ah-comayelob ; lay u naa nicté ca hokiob ; yuoub ahkin, yuoub ahau, yuoub holcan.

(1) it seems as if zac-tul ahau has been omitted here.

Lay u cuch nicté ahau; ca emi minanix u yanal, lay uile, cu than ; maix uah u cúchma. Tií tun ca hoki ix-háulah-nicté óczic u keban Bolon-ti-ku ; ox-teix ti hab u kin ca yalah cuchii; maix kuchi (1) chab; naci ku mitnal. Bolon ɔacab ca emi tu chun nicté ppizlimte yax bac ɔununix uayinah ca emi; ca u ɔuɔah u cabil bolon-yol-nicté tu ichil tun; ca cha íchamnii ix-hoyal nicté ; ca tun hoki u puczikal nicté lae. U ximbaltez-uba can-hekix ulac nicté lae ; ti-ix culan ahkin xocbiltun chumuc ; tii ca uchi u huku yol Oxlahun-ti-ku, maix yoheltah yemel u keban pop, ti kuix ta than cuchie, nicteix u pop, nicteix u kanché, nicté yema; zauin culic, zauin u ximbal, zauim u lac, zauin u luch, zauin u puczikal, zauin u naat, zauin u tucul, zauin u chi; cool u than ti yahaulili tu kin uat uil tu kin uat u kul tu xay u chi, lic u hanal tu pach u xau, lic uuil u chiic, ma chee, et ma tunich, chac u cool yan ti lahun-chan u uich ti culic ; zip u uich, zip u than, zip u can, zip u naat, zip u ximbal, kaxan u uich ; ti culic chac-cah u pop, culic tamuk yahaulil, tu ban u yum, tu ban u naa ; maix yohelma u naa alintee ; thabán u puczikal tu hunal ichil ix-ma-yumil ah poch yum, ichil ix-ma-nail bin ximbalnac, calan u mut, zatal u naat yicnal u yum, yicnal u naa ; minan tibil ti, minan utz tu puczikal, halili yan tu ni yak ɔeɔec loe; ma yohel bix bin ɔoccebal, maix yohel bal yan tu ɔoc yahaulili, lay ca bin ɔocnac u kinil u tepale (una raya así _____ con la que termina el párrafo).

He bolon-ti-ku lae, uich ahau-uil uinicob, ah-cakin-pop, ah-cakin-ɔam. Lay tali ichil ox-ahau katun ti-ix bin yanal u yanal u yumil peten yah-culcinahul u than u yanal katun ca bin ɔococ u than ah-ox-ahau katan tu kinil u concon mehen ; lay bin yanac yokol u nunil ah-ytzá, hun ua chuen, hun ua celem, hun ɔit tunil u kex u keban u nunil Ah-ytzá, lay Bolon-ti-ku, lay bin ɔoce-bal u than ah ox-ahau katun; ti-ix u natal naat yahaulil cabobi ; ɔocebal u than katun ti-ix uchu-canhal u chibal (2) almehenobi batabob yetel ú yanal ah-cux olalob, yetel u chibal batabob, lay muc-chec-tabí luum tu uichobe, cama-bal-hiob tumen u co kin, u co katun, u mehen kaz yalx buyuk ; lay zihob ca áhi cab ichil ah-ox-ahau katun.

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(1) Escribimos chab por falta de tipos mayas para representar la h con barra.

(2) dchibal escrito, así por falta de h con barra.

Bay bin ɔocebal u tepalob ah-cappel ichob ti cayumil ti *Dios*, hex ca bin zut-nac u than katun lae; ca tun u ɔah *Dios* yuchul hun-yecil tu ca-ten, lay hay-cabile. Lay tun cu ɔocole, ca tun emec cayumil ti Jesucrhisto to yokol komil Josapat, tu xax

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cah Jerusalen, uchic u lohic coon tu cilich kikel. Lay-ix bin emec ti noh muyal u ɔab tohol caanil, hah u manzah, ti zínan ti *cruz* ché cuchie; tii tun yemel ti noh u chucil ti noh-ix u tepal xan, hahal Dios, hahal ku; lay zíhez cáan yetel lúum, yetel yokol-cab tulacal; lay-ix bin emec táxcuntic yokol-cab xan, tu yutzil yetel u lobtacil yah-ɔoy-zah-ulob, ah-nunob.

LA CREACION DEL MUNDO.

VERSION CASTELLANA.

PROLOGO DEL AUTOR.

Es muy necesario creer esto. Esta es la piedra que nos dejó nuestro Dios Supremo. Su desayuno es ese licor del balché con el cual debemos honrarle nosotros los indios nobles.

Muy antiguamente eran adorados estos verdaderos dioses, estos "tunes." Estableciόse el culto del verdadero Dios, nuestro Señor Dios; no obstante que estos primitivos dioses, dioses finibles, yá habían dejado de regir y de ser adorados, perdieron sus virtudes por medio de la bendición del Señor de los cielos, cuando redimió al mundo, cuando resucitó, este verdadero Ser, verdadero Dios, cuando por su divino mandamiento se hicieron los cielos y la tierra.

Entonces fué cuando se corrompió vuestra adoración indios mayas! Despreciad, pues, este vuestro culto!

Historia del mundo en aquel tiempo; porque así está escrita; para que no llegue el día en que se utilicen esos libros, esos innumerables mandamientos; y tan solo porque se les pregunta á los indios si saben como fueron creados para poblar esta región nuestra.

Texto de la Creación, según los Mayas.

En el transcurso del *11 ahau* fué cuando vino (1) *ah-mucen-cab* á cubrir las caras de *Oxlahun-ti-ku*, (los nueve dioses); ni se supieron sus nombres, con excepción del de su hermana y el de sus hijos; y decían que ni aun eran visibles sus caras igualmente; entónces, cuando se hizo el mundo, no supieron que iban á ser arrojados por completo; y fué cogido *Oxlahun-ti-ku* por *Bolon-ti-ku*, (los nueve dioses); entonces fué cuando descendió el fuego; entonces fué cuando descendió la sal; entónces fué cuando descendieron las piedras y los árboles, y fué cogido *Oxlahun-ti-ku*, y le rompieron la cabeza, y lo abofetearon, y también lo llevaron á cuestas; y lo despojaron de su dragón y de su tizne; y se tomaron retoños de *yaxúm*, y se tomaron frijoles blancos, raíces tuberculosas desmenuzadas, y el corazón de pepitas de calabaza menudas, y de pepitas anchas de calabaza, desmenuzadas, y de frijoles negros desmenuzados. Hizo un envoltorio de semillas este primer *Bolon-ɔac-cab*, (nueve órdenes del mundo), y se fué al treceno cielo, y quedó formada la película terrestre y las puntas de las rocas del mundo.

Y se fué el corazón de *Oxlahun-ti-ku* negándose á ir los corazones de las raíces bulbosas. Y vinieron las sin-madres con los que pasan trabajos, las sin-maridos, que aunque vivas carecían de corazón; y envueltos en grama, fueron sepultados en el mar.

De un solo viaje nos vino el agua luego que tuvo lugar el robo del dragón. Se hundió el cielo; cayó sobre la tierra; y se dice que *Cantul-ti-ku*, (los cuatro dioses), los cuatro *Bac-cab*, fueron quienes lo destruyeron. Entonces, luego que terminó la destrucción universal, ellos pusieron nuevamente por morador y para ordenarlo de nuevo á *Kan-xib-yúi*. Y fué puesto en pie y al norte el árbol *ymix* blanco, *zac-ymix-ché;* y paró los horcones del cielo; y se decía que ese *zac-ymix-ché* era el símbolo de la destrucción universal. Y plantó el árbol *ymix* negro, *ek-ymix-ché*, lo plantó frente a *pix-oy*; y puso en pie á *kan-ymix-ché*, (el árbol *ymix* amarillo), símbolo de la destrucción universal, y lo plantó frente á *pix-oy*. Y estableció *kan-*

(1) Para que el texto no pierda toda su originalidad, hemos preferido traducir casi literalmente; así tendrá cada frase la significación que merece según nuestra interpretación, á lo que llegamos mediante un examen gramatical y lexicográfico de cada palabra.

xib-yui á *ix-kan-oyal-mut*, (el faisán ó trogon amarillo). Y también puso en pié á *yax-ymix-ché*, (el árbol *ymix* verde), en el centro, como símbolo de la destrucción universal.

Asienta, para y fija los platos ó cajetes de las cuatro mancuernas opuestas del *katun*, que son, *ah-pay-kab*, (ayudante), y *ah-pay-oc-tu-yum*, (mensajero) respectivamente.

Establece á *chac-piltec* al oriente del mundo con *ah-pay-oc-tu-yum.*

Establece á *zac-piltec*, al norte del mundo con *ah-pay-oc-tu-yum.*

Establece á *lahun-chan*, con *ah-pay-oc-tu-yum.*

Establece á *kan-piltec*, con *ah-pay-kab-tu-yum.*

"El mundo todo, dijo *Ah-uuc-chek-nale*, (el que es siete veces fecundador), procedió de los siete senos de la tierra."

Y descendió para fecundar á *Itzam-kab-ain*, (la ballena con pies de caimán), cuando bajó del ángulo central de la región celeste.

Giraban las cuatro luces, las cuatro regiones de las estrellas; aun no había luz; absolutamente no había sol; absolutamente no había noche; absolutamente no había luna. Despertaron; y desde entonces principió el mundo. En aquel instante comenzó el mundo. Trece *pic-oac* (1) ú órdenes numerales por siete veces, son el transcurso del principio del mundo.

Entonces amaneció.

Notal final: por razones de brevedad omitimos los comentarios gramaticales y lexicográficos.

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(1) *Pic-oac* ó *pic-oac-cab:* número grande, inumerable, (P.P. p. 277). Esto parece confirmar la teoría de Gordman; según este inteligente americanista, "las razas aborígenes pretenden comenzar su cronología con la creación del mundo". (The Archaic Maya Inscriptions. 1897, p. 6). No conociendo con certeza el valor numeral del *pic-oac*, no puede precisarse esta significativa fecha; pero sospechamos que se refiere á alguno de los grandes ciclos de su calendario; quizás á los 13 ciclos, ... (13. 0. 0. 0. 0. = 4 ahau 8 Cumku), de la Stela C. de Quirigua, (C. P. Bowditch, The Numeration; Calendar Systems and Astronomical knowledge of the Mayas, Cambridge, 1910, p. 319).

The word "Itzam" as meaning a whale, was obtained from Lorenzo Aban the carver of my planta dum S.J. Boxcutun, distant six miles from the font Telchac, who upon hearing it used in connection the old fisherman Chief of said font,

The mayan creators had no heart. Hence, in my opinion, the origin of human sacrifices, to supply them with what they needed most.

Berlin S. 59.
Fontane-Promenade

Die Zahlzeichen der Maya.

Von

Paul Schellhas.

Eine Geschichte der Mayaforschung zu schreiben, dürfte noch verfrüht sein. Diese Wissenschaft ist knapp ein halbes Jahrhundert alt und begann eigentlich erst mit der Herausgabe von zuverlässigen mechanischen Reproduktionen der Handschriften, von denen vorher nur eine Nachzeichnung der Dresdener in Kingsboroughs Riesenwerk vergraben war. Und doch muß man schon heute manchmal zurückschauen, wenn die Frage aufgeworfen wird, wer es war, der zuerst dieses oder jenes Problem der Mayaforschung gelöst hat. Dazu gehören die Zahlzeichen der Maya. Ihre Entdeckung fällt in das Frühstadium der Mayaforschung. Seit ihren Anfängen wurde unbestritten als feststehend angenommen, daß die Maya das bekannte System von Punkten und Strichen für die Zahlen von 1 bis 19 benutzten, und daß sie ein Vigesimalsystem hatten. Schon 1875 gibt Léon de Rosny in der Abhandlung „Mémoire sur la numération dans la langue et dans l'écriture sacrée des anciens Maya" im Compte rendu des 1. Internationalen Amerikanisten-Kongresses, Nancy 1875, S. 450/51, die Mayaziffern der Punkte und Striche wieder, allerdings noch mit verschiedenen Irrtümern, z. B. indem er für 20 vier Striche angibt und die 4 auch durch je zwei Punkte übereinander darstellt. Wer eigentlich der erste Entdecker der Zahlzeichen war, ist nicht ganz leicht festzustellen; anscheinend ist es Rosny gewesen. Jedenfalls hat er zuerst ein bestimmtes Resultat in dieser Frage veröffentlicht, wie auch Förstemann, „Die Mayahandschrift der Königl. öffentl. Bibliothek zu Dresden", Dresden 1892, Einleitung S. 5, annimmt. Cyrus Thomas in „A study of the manuscript Troano" (Contributions to North American ethnology, Vol. V, Washington 1882) S. 17, sagt über die Bedeutung der Zahlzeichen nur: „It is now generally conceded, that etc." ohne nähere Angaben. Man denkt natürlich zunächst an eine Überlieferung durch Landa oder irgendeinen anderen der spanischen Autoren zur Zeit der Eroberung. Aber es ist eine merkwürdige Tatsache, daß keiner der spanischen Schilderer der einheimischen Bevölkerung des Mayagebiets und ihrer alten Kulturverhältnisse etwas darüber berichtet, obgleich man doch meinen sollte, daß gerade die Ziffern ein interessanter und dabei einfacher, allgemein bekannter und alltäglicher Gegenstand waren. Selbst Landa in seiner „Relacion" bringt auffallenderweise die Zahlzeichen der Maya nicht. Das ist um so auffallender, als er ja die viel schwierigeren hieroglyphischen Tages- und Monatszeichen wiedergibt und die komplizierte Verbindung der ersteren mit Zahlen im Tzolkin eingehend behandelt. Er kombiniert aber die 20 Tageszeichen mit römischen Ziffern und erwähnt mit keinem Wort, wie die Maya in ihrer Hieroglyphenschrift diese Zahlzeichen schrieben, obgleich dies doch keineswegs schwierig war und hier geradezu auf der Hand lag. Dazu kommt noch, daß er in § XXIV seiner „Relacion" sogar die Art der Maya zu zählen, schildert: „Que su cuenta es de V en V, hasta XX, y de XX en XX hasta C, y de C en C hasta 400, y de CCCC en CCCC hasta VIII mil. Y desta cuenta se servian mucho para la contratation de cacao. Tienen otras cuentas muy largas, y que las protienden in infinitum, contandolas VIII mil XX vezes que son C y LX mil, y tornando a XX duplican estas ciento y LX mil, y despues yrlo assi duplicando hasta que hazen un incontable numero. Cuentan en el suelo o cosa llana." „Sie zählen von 5 zu 5 bis 20, dann in Zwanzigern bis 100, in Hunderten bis 400 und von 400 in Vierhunderten bis 8000 . . . Dann aber haben sie noch eine größere Zählung, die sich ‚in infinitum' erstreckt, indem sie die Zahl

800 zwanzigmal nehmen, was 160000 ausmacht; dann zur zwanzig zurückkehrend, verdoppeln sie die 160000, bis sie so verdoppelnd zu einer unendlichen Ziffer gelangen. Ihre Berechnungen machen sie auf dem Erdboden oder irgendeiner ebenen Fläche." In § XXXIV kommt Landa nochmals kurz darauf zurück und sagt: „Ya e dicho que el modo de contar de los indios es de cinco en cinco, y de quatro cincos hazen veinte . . ." Man kann nicht sagen, daß diese Angaben sehr klar sind, und man kann sich auch hier nur wundern, weshalb Landa bei seiner so genauen Schilderung nichts über die Ziffern der Maya sagt. Überdies stimmen seine Angaben auch, wie wir wissen, nicht überein mit dem Zahlensystem der Handschriften und der Inschriften. Von der bekannten Unregelmäßigkeit, der Abweichung vom Vigesimalsystem bei der zweiten Multiplikation mit 20, wie sie in den Handschriften und Inschriften sich zeigt, ist keine Rede. Über die Zeitrechnung der Maya berichten uns außer Landa auch andere spanische Autoren, wie Aguilar, Cogolludo, Pio Perez u. a. ebenfalls ohne, wie gesagt, der Zahlzeichen zu gedenken. Wegen der sprachlichen Formen der Mayazahlen vgl. Beltran „Arte de el idioma Maya" 2. ed. Merida 1859, S. 195—208, und Alfred M. Tozzer „A Maya grammar" in Papers of Peabody Museum, Vol. IX, 1921, S. 97ff. und 301.

An sich wäre es ja auch ohne irgendeine bestimmte Überlieferung nicht schwierig gewesen, die Zahlzeichen in den Handschriften zu erkennen, aber es gibt eine solche Überlieferung. Sie ist enthalten in einem der sogenannten „Bücher des Chilan Balam", und zwar dem von Káua, aus der Feder eines einheimischen Verfassers, erstaunlich spät, nämlich im 18. Jahrhundert, einem Manuskript in der Mayasprache, aufgeführt von Tozzer in seiner Bibliographie zu „A Maya grammar", und die Stelle ist abgedruckt und übersetzt bei Daniel G. Brinton in seinem Werk „The Maya chronicles", Philadelphia 1882 (Brintons Library of aboriginal american literature Nr. 1), S. 47/48. Brinton bezeichnet das Sammelmanuskript, in welchem dieses „book of Chilan Balam" enthalten ist, als „Codice Perez" und beschreibt es als „a series of extracts from various ancient Maya manuscripts obtained by the late distinguished Yucatecan antiquary Don Juan Pio Perez and named from him by Canon Crescencio Carrillo and other linguists. It is in 4to, pgg. 258". Hier heißt es in der Übersetzung von Brinton: "They (our ancestors) used (for numerals in their calendars) dots and lines (i. e. bars) back of them; one dot for one year, two dots for two years, three dots for three years, four dots for four, and so on; in addition to these they used a line; one line meant five years, two lines meant ten years; if one line and above it one dot, six years; if two dots above the line, seven years; if three dots above, eight years; if four dots above the line, nine; a dot above two lines, eleven; if two dots, twelve; if three dots, thirteen." Am Rande dieser Stelle gibt der Verfasser die Zahlen von 1 bis 13 in Mayazeichen wieder, und zwar die Einer nicht, wie überall in den Handschriften und auf den Steindenkmälern, durch runde Punkte, sondern durch kleine Vierecke: ▪. Morley in seiner „Introduction to the study of the Maya Hieroglyphs" S. 91 bezieht sich auf Brinton und gibt die Stelle wieder. Von Zahlzeichen für Null und für Zwanzig und von der Darstellung der höheren Zahlen durch mehrstellige Zahlen ist in dieser Schilderung keine Rede. Erst Förstemann fand das Zeichen für Null, und um dieselbe Zeit wurde auch das Zeichen für Zwanzig von ihm und verschiedenen anderen Forschern entdeckt. Vorher waren nur die Ziffern bis 19 bekannt, und Brinton bemerkt in seinem „Primer of Mayan hieroglyphics" S. 18, daß die Bedeutung der Striche und Punkte auch unabhängig von der Mitteilung durch den einheimischen Autor von verschiedenen Seiten erkannt worden sei. In der

Tat war das ja auch nicht schwierig. Endlich war es auch wiederum Förstemann, dem wir die Entdeckung des Systems der höheren Zahlen in den Handschriften nach Stellenwerten zu verdanken haben, wovon ebenfalls in der obigen Schilderung nichts erwähnt wird, so daß es danach scheint, als hätte die Zahlendarstellung durch Striche und Punkte gar kein Ende gehabt, sondern als seien auch höhere Zahlen, über 20, in dieser Weise dargestellt worden.

Wie bekannt, hatten die Maya aber noch eine zweite Art von Zahlzeichen, nämlich Köpfe und sogar ganze menschliche Figuren, durch welche die Zahlen von 1 bis 13 dargestellt wurden. Über 13 bis 19 wurden die Zahlen durch Kombination der Ziffer für 10 mit den Ziffern von 3 bis 9 gebildet, darüber hinaus ging diese Art der Zahlendarstellung nicht. Eine höchst merkwürdige Tatsache in verschiedener Hinsicht! Diese Zahlzeichen, die ausschließlich auf den Inschriften vorkommen, werden in keiner der alten Überlieferungen erwähnt; sie sind durch Seler entdeckt. Offenbar liegt ihnen nicht das Vigesimalsystem zugrunde; sie zeigen vielmehr Spuren eines Dezimalsystems und deuten zugleich auch auf die 13 Tageszahlen im Tzolkin. Morley vergleicht sie mit unseren arabischen Ziffern, weil sie für jede Zahl ein bestimmtes Zeichen in Gestalt eines Kopfes oder einer menschlichen Figur haben, während er die Punkt- und Strichziffern mit den römischen Zahlzeichen vergleicht, weil sie nicht für jeden Wert ein Einzelzeichen besitzen, sondern durch Wiederholung einiger weniger Elemente, wie I, V, X bei den römischen Ziffern, die höheren Zahlen bilden.

Die Tatsache, daß ein Volk zwei ganz verschiedene Systeme zur Bezeichnung von Zahlenbegriffen besitzt, würde an sich nicht weiter erstaunlich sein, wenn man wüßte, daß eines dieser verschiedenen Systeme von einem anderen Volke übernommen ist, oder sogar beide, wie dies bei uns bezüglich der römischen und der arabischen Ziffern der Fall ist. Höchst erstaunlich ist aber diese Tatsache bei den Maya. Hat dieses mathematisch so hoch begabte Volk seine beiden Systeme ohne auswärtigen Einfluß entwickelt, so ist das in der Tat beispiellos und bewunderungswürdig und setzt eine sehr alte und hohe Kulturentwicklung voraus. Von welchem anderen Volk könnte aber sonst wohl das eine oder das andere dieser Zahlensysteme übernommen worden sein? Wir wissen darüber nichts, und die Wahrscheinlichkeit, daß eine solche Übernahme stattgefunden hat, ist auch sehr gering. Die Darstellung von Zahlen durch Köpfe und ganze menschliche Figuren kommt außer bei den Maya nirgends in Amerika vor, und wir wissen von keinem Volk, das einen solchen Einfluß auf die Mayakultur gehabt haben könnte, um ihnen ein so eigenartiges Zahlensystem zu übertragen.

An die im vorstehenden kurz geschilderten Tatsachen knüpft sich eine ganze Reihe verschiedener Fragen. Wie kommt es, daß keiner der spanischen Schriftsteller aus der Zeit der Eroberung die Zahlzeichen der Maya erwähnt? Waren zu der Zeit, als Landa seine „Relacion" schrieb, also um 1565, die alten Zahlzeichen bereits vollständig vergessen und durch die römischen oder arabischen Ziffern verdrängt? Dann ist es aber auffällig, daß trotzdem das alte Kalendersystem noch allgemein bekannt gewesen sein muß, da es doch durch Landa eingehend geschildert wird. Weshalb wird nirgends, auch nicht von einheimischen Autoren in alten Manuskripten, wie den Büchern des Chilan Balam, erwähnt, daß es eine zweite Art der Darstellung von Zahlen durch Köpfe und menschliche Figuren gab, eine Art der Darstellung, die doch für Europäer oder europäisch, d. h. spanisch gebildete Eingeborene höchst merkwürdig und berichtenswert erscheinen mußte, falls sie ihnen noch bekannt war? Daß

diese Art der Darstellung im Mayavolke auch vor der Ankunft der Spanier nicht allgemein verbreitet gewesen sein kann, ist ohne weiteres anzunehmen; sie gehörte sicher zu den Kenntnissen kleiner Kreise gewisser Oberschichten. Waren aber auch die Zahlzeichen der Punkte und Striche, die Null und die Zwanzig, kein allgemeines Kulturgut und nur Geheimwissen der Priester? Weshalb aber nicht auch die Tages- und Monatszeichen? Ob die Kenntnis eines so abstrakten Begriffes, wie die Null, im Volke allgemein verbreitet war, mag man billig bezweifeln. Daß die Kenntnis der Hieroglyphen nicht jedermann zugänglich war, bezeugt Torquemada, der ausdrücklich berichtet, daß sie nur wenigen Vornehmen bekannt waren. Hatten die alten Maya überhaupt, d. h. im gewöhnlichen Leben, ein Ziffernsystem, und welches?

Bei der Prüfung dieser Fragen müssen zwei Tatsachen in Betracht gezogen werden. Einmal der Umstand, daß in der Ordnung der höheren Zahlen in der Punkt- und Strichart das Vigesimalsystem an der dritten Stelle, beim Tun, durchbrochen ist, indem nicht 20, sondern 18 Uinal ein Tun bilden. Das heißt, daß die Zahlen nicht durchweg nach dem Vigesimalsystem, also nach arithmetischen Grundsätzen, geordnet sind, sondern nach chronologischen Grundsätzen und zu chronologischen Zwecken, nämlich um, wie auch Tozzer und Ludendorff annehmen, das Tun möglichst an das Sonnenjahr von 365 Tagen anzugleichen. Daß ein so mathematisch begabtes Volk, wie die Maya, in einem allgemein gültigen Zahlensystem eine solche Unregelmäßigkeit zugelassen hätte, ist völlig undenkbar. Es bleibt also nur der Schluß übrig, daß das sogenannte Zahlensystem eben überhaupt kein allgemeingültiges System für alle Zwecke war, sondern nur eine Form der Zeitrechnung, daß die Punkte und Striche also überhaupt keine allgemeingültigen Zahlen bedeuteten, sondern ausschließlich Zeichen für bestimmte Einheiten von Tagen waren.

Völlig unzweifelhaft dürfte die Richtigkeit dieser Annahme hinsichtlich der Darstellung von Zahlenbegriffen durch Köpfe und ganze Figuren sein. Daß diese keine allgemeingültigen Zahlzeichen im eigentlichen Sinne sein konnten, bedarf wohl kaum eines Beweises. Sie sind ja zu diesem Zweck völlig ungeeignet. Sie kommen auch niemals allein vor, sondern stets in Verbindung mit Zeichen von Zeitabschnitten, Tagen, Monaten oder größeren Zyklen. Sie waren eben Symbole von Zeitabschnitten astronomischer und kalendarischer Art und dienten wohl nur lapidaren und monumentalen Zwecken, wie aus ihrer ausschließlichen Verwendung auf Steindenkmälern hervorgeht. In dieser Hinsicht können sie also eher mit unseren römischen Ziffern verglichen werden.

Daß aber auch die andere Art der Zahlzeichen, die durch Punkte und Striche gebildeten, keine allgemein gebräuchlichen Zahlzeichen waren, wird in gewissem Grade schon bestätigt durch die oben zitierten Angaben im Buche des Chilan Balam von Káua, wenn man sie genauer ansieht. Denn der Verfasser sagt keineswegs, daß seine Vorfahren, die alten Maya, die Zahlen schlechthin mit Punkten und Strichen bezeichneten, sondern daß sie die Jahre in ihrem Kalender in dieser Weise zählten, daß ein Punkt ein Jahr und ein Strich fünf Jahre bedeutete. Dabei liegt anscheinend ein bloßer Irrtum des alten Verfassers nur insoweit vor, als er meint, daß seine Vorfahren die Jahre als Zeiteinheiten durch Punkte und Striche gezählt hätten, während sie, wie wir wissen, nicht die Jahre, sondern die Tage in dieser Weise zählten. Der Irrtum erklärt sich wohl dadurch, daß der Verfasser längst an den europäischen Kalender gewöhnt war und die alte Art der Tageszählung des „long count“ nicht mehr kannte, weil sie in Vergessenheit geraten war, so wenig wie er noch von den monumentalen Zeichen der Köpfe etwas gewußt haben wird.

Daraus folgt also, daß die Punkte nur Tage oder im long count größere Vielfache von Tagen, die Striche nur eine Reihe von 5 Tagen oder größere Vielfache von 5 Tagen, das Zwanzigzeichen nur eine solche von 20 Tagen, die Null einen unvollendeten Zeitabschnitt, bedeuteten, und daß diese Zeichen eben keine eigentlichen Zahlzeichen, sondern Kalenderzeichen waren, daß das ganze System kein Zahlensystem, sondern ein Kalendersystem war, so ungefähr, wie auch in unserem heutigen Kalender gewisse astronomische Angaben durch symbolische Zeichen wiedergegeben werden. Es ist im übrigen keineswegs eine notwendige Annahme, daß ein Volk mit höherer Kultur besondere Zahlzeichen besitzen muß, insbesondere solche, die sich zum Rechnen eignen. Die Römer mit ihrer hohen Kultur kannten nur ihre schwerfälligen und zum Rechnen ganz ungeeigneten Ziffern und waren gezwungen, zum Rechnen eine maschinelle Vorrichtung, ein Rechenbrett (abacus), zu benutzen, wie sie in den Schulen heute beim Elementarunterricht verwendet werden, wie sie aber auch die Vorläufer unserer heutigen kunstvollen Rechenmaschinen waren, an deren Grundlagen schon Männer wie Pascal und Leibniz gearbeitet haben. Ebenso besaßen die Griechen, bei denen die ersten neun Buchstaben des Alphabets als Ziffern dienten, das Rechenbrett (ἄβαξ), wie auch die Chinesen und die Japaner. Die Peruaner benutzten zur Aufzeichnung von rechnerischen Angaben bekanntlich die Quippu, Schnüre mit Knoten. Sie haben aber anscheinend auch Rechenbretter besessen, wie sich aus dem Manuskript in spanischer Sprache eines peruanischen Eingeborenen, D. Felipe Huaman Poma de Ayala in der Bibliothek zu Kopenhagen ergibt (Henry Wassén, „The ancient peruvian abacus“, in „Comparative Ethnographical Studies“ von Erland Nordenskiöld, Vol. 9, Göteborg 1931). Ob auch die Maya Rechenbretter hatten, läßt sich nicht feststellen; weder die Kodizes noch die Inschriften und sonstigen bildlichen Darstellungen enthalten etwas, was man dahin deuten könnte. Angesichts der zahlreichen rechnerischen Angaben in den Handschriften könnte man wohl vermuten, daß gelegentlich solche Vorrichtungen abgebildet wären. Daß es in der Neuen Welt sogar Sprachen gibt, die nicht einmal Zahlwörter besitzen, sei nur nebenbei erwähnt. So heißt es von den Tschikito in Bolivien: „No se puede en Chiquito ni contar dos, tres, cuatro etc., ni decir segundo, tercero etc.“ (L. Adam u. V. Henry, „Arte y Vocabulario de la lengua Chiquita“, Paris 1880).

Auf welche Weise die alten Maya die schwierigen astronomischen Berechnungen in den Kodizes mit ihren in die Millionen gehenden Zahlen mit Hilfe ihrer Ziffern bewerkstelligt haben, ist nicht bekannt. Ob es möglich ist, mit den Mayaziffern in unserer Weise zu rechnen, zu addieren, zu subtrahieren usw., ist ohne umständliche Versuche nicht zu beurteilen. Erheblich störend würde dabei die schon oben erwähnte Unregelmäßigkeit beim dritten Stellenwert, dem Tun, empfunden werden; ob man diese beim Rechnen im Interesse eines vollständigen Vigesimalsystems irgendwie beseitigen könnte, läßt sich ebenfalls ohne weiteres nicht sagen. Versuche in dieser Richtung und überhaupt Versuche, mit den Mayaziffern in unserer Weise zu rechnen, müssen fachkundigen Mathematikern überlassen bleiben.

Um die Richtigkeit der hier niedergelegten Auffassung über die Zahlzeichen der Maya zu prüfen, muß untersucht werden, ob sich Beispiele dafür finden, daß diese Zeichen auch für andere Dinge als Zeitabschnitte, kalendarische und astronomische Angaben benutzt worden sind.

Spinden sagt über das Zahlensystem der Maya in „The reduction of the Mayan dates“ S. 54: „Although recorded examples are no longer

extant the Mayas undoubtedly made use of the straight (!) vigesimal system in connection with quantities of goods in commerce, tribute etc., and probably also in censuses of population." In der Tat spricht für diese Ansicht das obige Zitat aus Landas „Relacion"; man kann also auch nicht einmal sagen, daß keine Überlieferungen existieren, wie Spinden meint. Aber die Annahme, daß die Maya im gewöhnlichen Leben ein strenges, konsequent durchgeführtes Vigesimalsystem, ohne die Unregelmäßigkeit in der dritten Stelle hatten, ist nur eine Hypothese, für die wir keinen Beweis haben, wenn wir auch ein Beispiel dafür bei den Cakchiquel finden (Seler, Gesammelte Abhandlungen I, S. 504ff.), und damit ist auch die Frage der Zahlzeichen nicht beantwortet[1]). Morley bemerkt in „An introduction to the study of the Maya hieroglyphs" S. 105, Anm 1: „Wether the Maya used their numerical system in the inscriptions and codices for counting anything besides time is not known." Das dürfte die richtige Auffassung von der Sachlage sein: wir wissen es nicht.

Was die Handschriften anlangt, so ist kaum noch ein Zweifel möglich, daß ihr Inhalt fast durchweg mythologischer, kalendarischer und astronomischer Art ist. Ganz besonders gilt das von der Dresdener. Wir verdanken den scharfsinnigen Untersuchungen Ludendorffs in den „Sitzungsberichten der Preußischen Akademie der Wissenschaften" einen hochinteressanten Einblick in das erstaunlich bedeutende astronomische Wissen, das die Maya in dieser Handschrift in langen Reihen von hohen, in die Millionen gehenden Zahlen niedergelegt haben. Alle Zahlzeichen, die in der Dresdener Handschrift vorkommen, beziehen sich offenbar auf die Zeitrechnung und damit in Verbindung stehende astronomische Angaben. Wir finden überall das unregelmäßige, beim Tun durchbrochene Vigesimalsystem, und die Ziffern erscheinen stets in Verbindung mit Tages- und Monatszeichen. An keiner Stelle trifft man auf Darstellungen oder Zahlengruppen, die etwas anderes bedeuten könnten. Selbst da, wo Kämpfe dargestellt zu sein scheinen, wie auf den Seiten 60 und teilweise 46—50, handelt es sich offenbar nicht um eigentliche kriegerische Szenen, sondern um mythologische Symbolik, und die Kämpfer sind Gottheiten oder personifizierte Gestirne, die dabei vorkommenden Zahlen die üblichen kalendarisch-chronologischen.

Es ist eine auffallende Tatsache, die schon in der Abhandlung „Die Madrider Mayahandschrift" („Z. f. Ethnol." 1929, S. 29 unter a) bezüglich jener Handschrift erörtert worden ist, die aber auch bezüglich der übrigen Handschriften gilt, daß die drei auf uns gekommenen Mayakodizes so gar nichts enthalten, was man als geschichtliche Überlieferung irgendwelcher Art ansehen könnte. Weder „gesta majorum" noch Berichte über Kriege, Kämpfe mit fremden Völkern, Seuchen, Überschwemmungen, Orkane u. dgl., die nach den Mitteilungen der spanischen Autoren den Inhalt solcher Handschriften zu bilden pflegten, finden sich. Es mag Zufall sein, daß die drei Handschriften, die der Vernichtung entgangen sind, gerade dergleichen Gegenstände nicht behandeln, aber die Tatsache steht fest, und sie ist sehr bedauerlich. Sie ist um so merkwürdiger, als es in den Mayahandschriften, wenigstens in der Dresdener und der Madrider, im übrigen an Darstellungen bewaffneter Gestalten keineswegs mangelt. Im Gegenteil: sämtliche Arten von Waffen, die bei den Maya damals gebräuchlich waren, sind abgebildet, vor allem das Wurf-

[1]) Sprachlich war allerdings das strenge Vigesimalsystem vorhanden, denn nach den Mitteilungen der spanischen Autoren zur Zeit der Eroberung hießen 20 Einheiten ein qal, 20 qal (= 400) ein baq, 20 baq (= 8000) ein pik, 20 pik (= 160 000) ein kalab, 20 kalab (= 3 200 000) ein qintšil, 20 qintšil (= 64 000 000) ein alaw.

brett und die dazugehörige Pfeile oder kurzen Speere, eine Art Beil und Schilde, während Bogen und Pfeil, wie schon früher von mir hervorgehoben, vollständig fehlen. Auch Darstellungen von kämpfenden und im Kampf getöteten oder wenigstens niedergeworfenen und von Speeren durchbohrten Gestalten fehlen nicht, so außer den schon oben erwähnten Stellen Dr. 46—50 und 60 im Cod. Tro 29*c, 28*c und 27*c, sowie Tro 3c, 7a und 29*a. Indessen alle diese Darstellungen sind offenbar mythologischer, nicht geschichtlicher Art. In der Pariser Handschrift fehlen, so weit sich das bei dem schlechten Erhaltungszustande dieser Handschrift beurteilen läßt, Darstellungen von Waffen und Kämpfen gänzlich, alle Figuren erscheinen unbewaffnet.

Wir wissen, daß in den mexikanischen Handschriften Tributlisten und ähnliche Aufzählungen vorkommen, Verzeichnisse von Städten und andere statistische Angaben, die mit Zahlen in den üblichen Formen der aztekischen Bilderschrift, Ziffern, die von denen der Maya erheblich abweichen und wesentlich primitiver sind, verbunden sind. Nichts Derartiges findet sich in den Mayahandschriften. Ja, auch sonst, in Inschriften, Reliefs, auf Stelen und Tongefäßen mit bildlichen Darstellungen aus dem alten Mayagebiet, sind andere als mythologische, insbesondere historische Gegenstände auffallend selten, kaum vorhanden. Die großen, figurenreichen Reliefs an den Tempelwänden in Palenque, die kunstvollen Denksäulen in Copan, Quirigua usw., sind keine Denkmäler zur Erinnerung an siegreiche Kriege, gewonnene Schlachten, Eroberungen und ruhmreiche Herrscher, sondern haben überwiegend mythologische und astronomische Bedeutung. Die mannigfachen kriegerischen Szenen, die wir in Chichen-Itza und in den Ruinenstädten des mittleren und oberen Usumacintagebietes, wie in Yaxchilan und Piedras Negras, dargestellt finden, bilden eine Ausnahme (vgl. T. A. Willard. „The city of the sacred well", S. 216, 221 u. 253, H. Spinden, „A study of Maya art", S. 21, 23, und Teobert Maler „Researches in the Usumacintla valley", Yaxchilan, Stele 11, Bd. II Taf. LXXIV, und Piedras Negras, Stele 12, das. Taf. XXI, in Memoirs of Peabody Museum, Vol. II). Wieweit in Chichen-Itza der auch sonst bekanntlich erkennbare Einfluß der kriegerischen Azteken mitgewirkt haben mag, sei dahingestellt. Waren die Maya, besonders im alten Reich, kein kriegerisches Volk? Standen ihnen die astronomischen Forschungsergebnisse ihrer Priesterschaft und die religiösen Zeremonien höher als kriegerischer Ruhm? Wir wissen es nicht. Aber wir vermissen, von wenigen Ausnahmen abgesehen, die ruhmredigen Erinnerungsbilder an siegreiche Kämpfe gegen feindliche Völker, wir vermissen die Gestalten prunkvoller Herrscher, die in der Schlacht die Feinde massenhaft niederwarfen, die Scharen der Gefangenen, Darstellungen, wie wir sie von den alten Ägyptern und vielen anderen Völkern kennen. Wo sind bei den Maya die Abbildungen ihrer Herrscher? Sie scheinen, außer in den oben erwähnten Fällen, gänzlich zu fehlen. Die Maya der früheren Jahrhunderte im alten Reich haben offenbar lange Zeiten hindurch in ungestörtem Frieden gelebt, während ihre Kultur auf der Höhe ihrer Entwicklung stand, und wenn zur Zeit der Ankunft der Spanier berichtet wird, daß die Eingeborenen sehr kriegerisch gewesen seien, so mag sich dies wohl dadurch erklären, daß die Zeiten des Friedens damals bereits vorüber waren, und Kriege mit feindlichen Nachbarvölkern, die in das Land einfielen, den Charakter des Volkes geändert hatten.

Es muß auch in Betracht gezogen werden, daß im Mayagebiet kein großes und mächtiges einheitliches Reich mit kriegerischer Expansionsneigung bestanden hat, wie in Mexiko, und daß die kleineren Staatsgebilde in älteren Zeiten wahrscheinlich mehr lokaler Art waren und von

Häuptlingen von mehr lokaler Bedeutung regiert wurden. Fanden doch die Spanier bei ihrer Ankunft im Mayagebiet nicht weniger als 15 kleine unabhängige Staatswesen vor! Jedenfalls treffen wir nirgends in den Handschriften und Inschriften auf Verzeichnisse von Gefangenen, eroberten Städten oder ähnliche statistische Angaben mit Zahlen, aus denen wir ersehen könnten, daß die Maya ihre Ziffern auch für andere Dinge als Zeitabschnitte verwendet haben. Selbst auf dem interessanten Relief der Stele Nr. 12 von Piedras-Negras (vgl. Teobert Maler „Researches", in Memoirs of Peabody Museum, Vol. II, Taf. XXI), wo wir eine Anzahl Kriegsgefangener dargestellt sehen, sind in den dabeistehenden Hieroglyphen keinerlei Zahlen zu finden, die sich auf die so naheliegende Angabe der Anzahl dieser Gefangenen beziehen könnten.

Es bleibt endlich nur noch zu prüfen, ob etwa in der Madrider Handschrift, deren Inhalt ja mannigfaltiger und weniger ausschließlich mythologischer Art ist, sich Stellen finden, wo die Ziffern für andere Dinge als Zeitabschnitte benutzt worden sind. Aber es findet sich auch in dieser Handschrift hierfür nirgends ein Beispiel. Es kommen an manchen Stellen allerdings Zahlen vor, die anscheinend keinen Sinn haben, so Cort. 8, 35a, Tro 23—20. Förstemann hält sie für sinnlose Spielereien, was ja, wenn man die Madrider Handschrift als ein Zauberbuch für Wahrsagung ansieht (vgl. Z. f. Ethnol., Jahrg. 1929, S. 30, 31) wahrscheinlich zutreffend ist. Jedenfalls zeigt sich an den genannten Stellen nichts, was darauf hindeuten könnte, daß es sich dort um Zahlen von anderer Bedeutung als sonst in den Mayahandschriften handelt, daß irgendwelche Aufzählungen oder ziffernmäßige Angaben anderer als chronologischer Art beabsichtigt sein könnten. Wohl die auffallendste Darstellung in dieser Hinsicht ist die Cort. 8 befindliche. Dort sehen wir den Todesgott A in gebückter Haltung unter einem sesselartigen Gestell stehen, das anscheinend von ihm auf dem Rücken getragen wird. Auf dem Gestell sitzt der alte Gott D, und die Seite dieses Gestells ist mit Zahlen bedeckt, die völlig ungeordnet durcheinanderstehen und keinen Sinn ergeben. Ein ähnliches Gebilde mit ebenso unverständlichen Zahlen sieht man Cort. 35a. Man könnte bei der Darstellung Cort. 8 auf den Gedanken kommen, daß es sich um die Anzahl von Kriegsgefangenen handelt, die dem Gotte D geopfert werden sollen. Indessen diese Deutung scheint ausgeschlossen. Das Ganze weicht in keiner Weise von den üblichen mythologischen Darstellungen ab, und daß es sich um gefangene Feinde handelt, ist nirgends ersichtlich. Auch kommt in den Zahlen das bekannte Zeichen der 20 und die Spirale vor, die beide chronologische Bedeutung haben. Die ähnliche Darstellung Cort. 35a zeigt ebenfalls nichts Ungewöhnliches.

Man muß zu dem Ergebnis kommen, daß in keiner der Mayahandschriften die Zahlzeichen anders als zur Bezeichnung von Zeitabschnitten benutzt wurden, und daß auch in den Inschriften sich kein Anhalt für eine andere Verwendung bietet.

Damit schließen sich die Zahlzeichen an das System der übrigen hieroglyphischen Zeichen in den Handschriften und Inschriften der Maya an, die ebenfalls kein allgemeines System, keine Schrift in unserem Sinne bilden, mit der man die Sprache in ihrer Gesamtheit wiedergeben, alles ausdrücken kann, was man auch in Worten sagen kann, sondern, wie bereits in der Abhandlung „Die Madrider Mayahandschrift" (Z. f. Ethnol. 1926) S. 24ff. ausgeführt, lediglich ein System feststehender symbolischer Zeichen für eine beschränkte Anzahl von bestimmten mythologischen, kalendarischen, chronologischen, astronomischen und verwandten Begriffen darstellen, ein System, das weder Zeichen für die geläufigsten Wörter der Sprache besitzt, noch die Fähigkeit, grammatische Formen und sprachliche Sätze zu bilden.

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Grundlegendes zur Zeitbestimmung der Maya. — Eine Aufgabe der geschichtlichen Himmelskunde[1]).

Von

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Seit 1930 hat Prof. H. Ludendorff, der Direktor des Astrophysikalischen Observatoriums in Potsdam, in einer Reihe von Veröffentlichungen der Preußischen Akademie der Wissenschaften zu einer der umstrittensten Fragen der Mayaforschung, zu der Frage der Umrechnung der inschriftlich und handschriftlich erhaltenen Mayadaten in die europäische Zeitrechnung, als Astronom Stellung genommen. Der Umrechnungsansatz Spinden, der neben dem (knapp 260 Jahre später liegende Daten ergebenden) Ansatz Goodman-Thompson-Teeple zur engeren Wahl

[1]) Die folgende Arbeit wurde am 29. November 1935 abgeschlossen und zum Druck eingereicht.

steht (weitere Ansätze sind aufgeführt bei Teeple: Maya Astronomy, p. 104—109), scheint durch Ludendorffs Arbeiten astronomisch gesichert. In Heft 1/3 des Jahrgangs 1935 der „Zeitschrift für Ethnologie" ist auf S. 49—68 ein gleichfalls astronomisches Referat von R. P. C. Schulz abgedruckt über den jetzigen Stand des Umrechnungsproblems. Vgl. auch den dort auf S. 43—49 vorhergehenden, für den zweiten Ansatz eintretenden Aufsatz von Prof. H. Beyer, Mitglied des Department of Middle American Research an der Tulane University of Louisiana in New Orleans, USA. Schulz scheint nach seinen einleitenden Sätzen Spinden-Ludendorff zu bevorzugen.

Die Arbeit von Schulz bedarf der Ergänzungen: zum Teil sind die entscheidenden astronomischen Gegebenheiten nicht scharf genug erkannt, zum Teil ist die Darstellung an wichtigen Stellen nicht frei von Einseitigkeiten, so daß dem nichtfachmännischen Leser das mitspielende Abwägen der Möglichkeiten erschwert oder unmöglich gemacht wird.

Ich folge in meiner Kritik, soweit es angängig ist, der äußeren Anordnung bei Schulz.

I. Der Umrechnungsansatz Goodman-Thompson-Teeple.

1. Die Einleitungsdaten der Finsternistafel des Dresdener Kodex.

Die drei Einleitungsdaten der Finsternistafel im Dresdener Mayakodex sind (ich rechne wie Schulz um nach dem Ansatz Thompson II, also nach der Gleichung: Überlieferter Mayatag + 584285 = Julianischer Tag; alle Daten sind — falls nichts anderes angegeben wird — wie bei Schulz julianisch):

8. November 755 (Hauptdatum: rechnerisches Ausgangsdatum der Finsternistafel).
23. November 755.
8. Dezember 755.

Schulz (S. 51) hat übersehen oder für nicht erwähnenswert gehalten, daß am 8. Dezember 755 eine bei Oppolzer aufgeführte partielle Sonnenfinsternis stattfand (im Mayagebiet nicht sichtbar). Ferner war der 8. November 755 zwar nur Neumondstag ohne Sonnenfinsternis, aber die astronomische Nachrechnung ergibt, daß der Schattenkegel des Mondes bei der Konjunktion Sonne—Mond nur um wenige Kilometer an der nördlichen Erde vorbeistreifte: es war sozusagen eine „irreale" Sonnenfinsternis. Für die Mayaastronomen waren der 8. November, der 23. November (totale Mondfinsternis, im Mayagebiet nicht sichtbar: vgl. Schulz) und der 8. Dezember 755 als Finsternistage gleichwertig: an keinem der drei Tage konnte von ihnen eine Sonnen- oder Mondfinsternis beobachtet werden. Und trotzdem haben sie die drei Tage ihrer Finsternistafel vorangestellt als die theoretischen Grundtage ihrer Finsternisrechnungen.

2. Die Sonnen- und Mondfinsternisreihen des Cod. Dresd.

a) Sonnenfinsternisse. Schulz spricht erst auf S. 56 in zwei kurzen Absätzen von den Sonnenfinsternissen des Ansatzes Thompson. Seine Angaben sind hier ungenügend.

Gehe ich aus vom 8. November 755, dem Datum der „irrealen" Sonnenfinsternis und dem Ausgangsdatum der Mayafinsternistafel, die sich über eine Periode von 11960 Tagen ($= 32^3/_4$ Jahren) erstreckt, so treffe ich nach dem Oppolzerschen Kanon 21 mal ununterbrochen nach je einer Mayafinsternisperiode auf eine Sonnenfinsternis. Nachdem

dann für zwei Perioden eine Unterbrechung eingetreten ist, taucht die Finsternis noch ein letztes Mal am 19. September 1541 auf. Vor dem 8. November 755 trat die Finsternis zum ersten Mal vor 1 Periode am 10. Februar 723 auf. Die Finsternisreihe läßt sich also mit Hilfe unserer heutigen Tafeln über 25 Perioden = $818^1/_2$ Jahre verfolgen. Schulz erwähnt diese im Ansatz Thompson für den Cod. Dresd. wichtigste Reihe nicht, obwohl er sich wenigstens mit Mondfinsternisreihen des Ansatzes Thompson eingehend beschäftigt (siehe seine Tafel II auf S. 56—58). Die Reihe ist überhaupt meines Wissens bisher als solche nicht erkannt oder behandelt worden. — Sichtbar im Mayagebiet waren von dieser Reihe 9 (bzw. 7) Finsternisse (ich zähle den 8. November 755 als Nr. 0):

Nr. 4 am 30. Oktober 886 (vielleicht nicht ganz sichtbar).
Nr. 6 am 26. April 952 unbedeutend.
Nr. 7 am 23. Januar 985 unbedeutend.
Nr. 9 am 21. Juli 1050 (vielleicht nicht ganz sichtbar).
Nr. 10 am 19. April 1083 sehr auffällig.
Nr. 11 am 16. Januar 1116 auffällig.
Nr. 12 am 14. Oktober 1148 gut sichtbar.
Nr. 13 am 13. Juli 1181 auffällig.
Nr. 15 am 8. Januar 1247 sehr auffällig.
Schulz führt nur Nr. 6 und Nr. 10 an.

b) Sonnenfinsternisse. Rechne ich ebenso in Mayafinsternisperioden nach vorwärts und nach rückwärts von dem neben dem 8. November überlieferten Sonnenfinsternisdatum des 8. Dezember 755, 30 Tage später, so treffe ich nach vorwärts noch zweimal auf eine kleine Sonnenfinsternis: die letzte fand am 3. Juni 821 statt. Nach rückwärts, in die Vergangenheit hinein, werden vom 8. Dezember 755 aus 18 mal ununterbrochen nach je einer Mayaperiode Sonnenfinsternisse getroffen. Die Finsternis verschwindet dann für 1 Periode und erscheint zum erstenmal 1 Periode vorher am 17. Januar 101. Die Reihe ist also für uns faßbar für 22 Perioden = $720^1/_2$ Jahre. Sie wird von Schulz nicht erwähnt. — Sichtbar im Mayagebiet waren von der Reihe 4 Finsternisse (ich zähle wieder den 8. Dezember 755 als Nr. 0):

Nr. — 1 am 11. März 723 unbedeutend.
Nr. — 3 am 13. September 657 unbedeutend.
Nr. — 9 am 27. März 461 unbedeutend.
Nr. — 10 am 28. Juni 428 auffällig.
Die 4 Finsternisse werden von Schulz genannt (nur die letzte mit Angabe des Datums).

c) Sonnenfinsternisse. Die unter b besprochene Sonnenfinsternisreihe (für uns in 22 Mayaperioden laufend vom 17. Januar 101 bis zum 3. Juni 821) schließt sich an die unter a nachgewiesene Reihe (25 Perioden vom 10. Februar 723 bis zum 19. September 1541) in der Art an, daß neben den letzten, nur noch partiellen und im Mayagebiet nicht sichtbaren Finsternissen der Reihe b auch schon, je einen Monat vorher, die Reihe a je mit kleiner (ebenfalls dort nicht sichtbarer) Finsternis erscheint. Einige Perioden weiter ist dann die Reihe b ganz verschwunden und die Reihe a an ihre Stelle getreten: Die b-Finsternisse liegen also alle einen Monat später, als wenn die Reihe a schon gelaufen wäre. Schulz gebraucht in ähnlichem Zusammenhang, wo er von den Mondfinsternissen spricht (Tafel II), den Ausdruck „Umschaltung". Allgemein gilt die astronomische Gesetzmäßigkeit: Die durchschnittliche Länge jeder beliebigen in Mayaperioden fortschreitenden Finsternisreihe, gemessen von abgewogener Mitte der Anfangsablösung bis Mitte der Endablösung,

beträgt rund 19 Perioden = 622 Jahre. Die beiden Daten des Cod. Dresd., der 8. November und 8. Dezember 755, liegen, als theoretische Ablösungsdaten der beiden Reihen a und b angesehen, symmetrisch innerhalb der Ablösungsperioden. — Wie die Reihe a aus der Reihe b herauswuchs, so die Reihe b aus einer vor ihr viele Jahrhunderte gültigen, deren Finsternisse alle einen Monat später lagen, als wenn die Reihe b beliebig weit in die Vergangenheit hinein schon gültig gewesen wäre. Diese Sonnenfinsternisreihe c lief, wie wir wieder (wie bei a und b) Oppolzer entnehmen, vom 26. Dezember — 522 über 21 Mayaperioden = $687^1/_2$ Jahre hin bis zum 13. August 166. — Sichtbar waren im Mayagebiet von der Reihe nur 2 Finsternisse:

am 15. September — 358
und am 1. Dezember — 129,

beide in mittlerer Größe sichtbar. Schulz erwähnt die Finsternisse der Reihe c nicht mehr.

d) Mondfinsternisse. Das dritte Einleitungsdatum der Finsternistafel im Cod. Dresd. ist (nach Thompsons Ansatz) der 23. November 755, 15 Tage nach dem 8. November 755 der Sonnenfinsternisreihe a. Am 23. November 755 fand nach Oppolzer eine totale, im Mayagebiet nicht sichtbare Mondfinsternis statt. Rechne ich von diesem Datum in Mayaperioden vorwärts und rückwärts, so ergibt sich aus Oppolzer: Am 3. März 592 setzte mit kleiner Finsternis eine Mondfinsternisreihe ein, die sich über 14 Perioden = $458^1/_2$ Jahre hinweg bis zum 5. August 1050 erstreckte. — Sichtbar im Mayagebiet waren von der Reihe 6 Finsternisse (Numerierung geht vom 23. November 755 = Nr. 0 aus):

Nr. — 5. am 3. März 592 Ende sichtbar.
Nr. — 1 am 24. Februar 723 Ende sichtbar.
Nr. 4 am 15. November 886. Anfang sichtbar.
Nr. 5 am 14. August 919 total.
Nr. 6 am 12. Mai 952 partiell (mittlere Größe).
Nr. 7 am 7./8. Februar 985 partiell (unbedeutend).

Schulz führt in seiner Tafel II am Anfang nur den vor dem 23. November 755 liegenden Teil der Reihe an mitsamt den ersten beiden sichtbaren Finsternissen.

e) Mondfinsternisse. Auch die soeben besprochene Mondfinsternisreihe wird bei ihrem Ablauf von einer anderen Reihe abgelöst, deren Finsternisse alle einen Monat früher liegen, als wenn die erste Reihe selbst weiterliefe. Diese neue ablösende Reihe e setzt, nachdem die Grundreihe d schon seit 5 Perioden verklungen ist, am 27. März 1214 ein und läuft über 14 Perioden = $458^1/_2$ Jahre hin bis zum 7. September 1672 (greg.). Die Ablösung der Reihen erfolgt prinzipiell-astronomisch ebenso wie bei den Sonnenfinsternissen, nur daß die Mondreihen sich nicht überschneiden und einige Perioden hindurch keine der beiden Reihen erscheint. Durchschnittliche Länge jeder Reihe auch hier rund 19 Perioden, davon 14—15 real. — Sichtbar sind von der neuen Reihe e im Mayagebiet 7 Finsternisse:

Am 27. März 1214 Anfang sichtbar.
Am 23. Dezember 1246 partiell (mittlere Größe).
Am 13. September 1410 total.
Am 7. Dezember 1508 Anfang sichtbar.
Am 5. September 1541 total.
Am 10. Dezember 1639 (greg.) partiell (unbedeutend).
Am 6./7. September 1672 (greg.) partiell (unbedeutend).

Diese späte Reihe erscheint bei Schulz nicht, sie hat auch für den Cod. Dresd. im Ansatz Thompson anscheinend keine Bedeutung mehr (siehe unter g: die Reihe konnte dort nicht mit nachgewiesen werden).

f) Mondfinsternisse. Die ursprüngliche Mondfinsternisreihe d, die vom 3. März 592 bis zum 5. August 1050 lief, war ihrerseits die Ablösung einer vor ihr geltenden, deren Finsternisse alle einen Monat später liegen. Diese ältere Reihe f setzte am 14. Mai — 63 ein, lief über 15 Perioden = $491\frac{1}{4}$ Jahre und endete am 12. Juli 428, 5 Perioden vor Auftauchen der sie ablösenden Reihe d. — Sichtbar im Mayagebiet waren in der alten Reihe f 11 Finsternisse: außer den 8 bei Schulz in seiner Tafel II als sichtbar aufgeführten noch die Finsternisse:

Am 8. November 2 Ende sichtbar.
Am 1. Februar 101 Ende sichtbar.
Am 21. Juli 297 Anfang sichtbar.

Diese Reihe ist bei Schulz in Tafel II vollständig aufgeführt. Und ebenso die ihr nach „Umschaltung" vorhergehende, deren Finsternisse wieder einen Monat später lagen.

g) Zusammenfassung. Auf den Einleitungsseiten der Finsternistafel des Cod. Dresd. sind in Längsspalten eine Reihe von Vielfachen der Periodenzahl 11960 aufgeführt. Darunter stehen fünf verschiedene Mayadaten in Tzolkinbezeichnung, in jeder Längsspalte jedesmal die gleichen fünf wiederholt.

Das oberste Datum: 12 Lamat, ist der Tzolkintag des Hauptdatums, im Ansatz Thompson des 8. November 755. Bei Addition oder Subtraktion von 11960 oder einem Vielfachen von 11960 wird im Mayakalender der gleiche Tzolkintag erreicht. In schematischer Rechnung ist also diese erste Tagesbezeichnung das Mayadatum für die Sonnenfinsternisse, die in Absatz a angeführt sind. Daß außer niedrigeren Vielfachen von 11960 ausdrücklich als größtes innerhalb einer Gruppe das 18fache aufgeführt ist, könnte bedeuten, daß die Sonnenfinsternisreihe, die rechnerisch am 8. November 755 begann, von den Mayaastronomen als für 18 Perioden theoretisch geltend angesehen wurde (das wäre bis zum 3. April 1345). Am 8. Januar 1247 war die Reihe im Mayagebiet zum letztenmal sichtbar.

Das folgende Tzolkindatum: 1 Akbal, liegt 15 Tage später als das erste, es ist der Tzolkintag der Mondfinsternisreihe d. Vielleicht wieder gelten als theoretische Begrenzung dieser Reihe nach vorwärts und nach rückwärts die Höchststellen einer ersten Gruppe der darüber aufgezeichneten Vielfachen von 11960: das Fünffache oder Sechsfache.

Das dritte Tzolkindatum: 3 Eznab, 15 Tage nach dem zweiten und 30 Tage nach dem ersten, ist der Tzolkintag der Sonnenfinsternisreihe b. Theoretische Begrenzung könnte wieder sein, diesmal nach rückwärts, das 18fache von 11960 (14. Juli 166).

Das vierte Tzolkindatum: 5 Ben, wieder 15 Tage weiter, ist im Schema der Tzolkintag der Mondfinsternisreihe f.

Das fünfte aufgeführte Datum endlich: 7 Lamat, nochmals 15 Tage später, ist, wieder in der schematischen Tafelrechnung, der Tzolkintag der Sonnenfinsternisreihe c, deren Finsternisse einen Monat (schematisch = 30 Tage) später liegen als die der Reihe b. Das höchste aufgeführte Vielfache: $39 \cdot 11960$, führt vom 8. November 755 rechnerisch zurück auf die Tage um den 26. Dezember — 522, den theoretischen und wirklichen Anfang der Reihe c.

3. Die eigentliche Finsternistafel des Cod. Dresd.

Die Datumtafel des vorigen Abschnittes 2g mitsamt den Periodenvielfachen war nur im Schema mit genügender Genauigkeit zu gebrauchen. Daß die eigentliche Finsternistafel des Cod. Dresd. dagegen auf den Tag genaue Treffwerte für die Vorhersage der Finsternisse liefert, das will ich in diesem Abschnitt nachweisen. Ich gebe nur die Ergebnisse, ohne weiter die einschlägigen Bemerkungen von Schulz (S. 54f. und S. 64f.) heranzuziehen, die durch das Folgende überholt sind. Es sind Ergebnisse (ebenso wie die der vorhergehenden Abschnitte), die seit Jahren für mich feststehen und über die ich seit 1931 mit Prof. Ludendorff in mündlicher und schriftlicher Diskussion stehe. Teeple ist in seiner „Maya Astronomy" (1930) in dem Abschnitt „Eclipses" (p. 86—93) bis hart an die letzte Erkenntnis herangekommen. Ich gebe dem toten Mitforscher die Ehre.

In jeder beliebigen nach der Mayaperiode von 11960 Tagen abgeleiteten Finsternisreihe trifft nur im Schema je nach 11960 Tagen eine Finsternis ein. In Wirklichkeit ist der Wert von 11960 Tagen ein wenig zu groß (der heutige astronomische Wert ist: 11959.888 Tage; vgl. Ludendorff: Abhandlung Nr. 2, S. 16). Das hat zur Folge, daß, nachdem einige Male (im Durchschnitt achtmal) je nach 11960 Tagen eine Finsternis eingetreten ist, dann die nächste schon auf den vorhergehenden Tag fällt, also bereits nach 11959 Tagen erscheint. Dann gilt wieder für eine Reihe von Perioden der Hauptwert, bis wieder die Finsternis einen Tag früher eintritt. Dieser Tag bleibt dann in der Regel bis zum Verschwinden der Reihe gültig. Die Tafel II bei Schulz gibt für den, der sie lesen kann, gute Beispiele für diesen Verlauf. In der Tzolkindatierung der Maya sieht das so aus: Jede Finsternisreihe durchläuft in der Zeit ihres Bestehens drei aufeinanderfolgende Tzolkintage. Sie schiebt sich langsam, jeweils mehrere Perioden hindurch an einen bestimmten Tzolkintag gebunden, an den nächstvorhergehenden heran, durchläuft dann diesen und erreicht schließlich den wieder vorhergehenden Tag.

Diese drei Tzolkintage, die von jeder Sonnen- und Mondfinsternisreihe durchlaufen werden, sind in der Dresd. Finsternistafel bei jeder der dort gegebenen 69 Finsternisse ausdrücklich aufgeführt. Die Tafel gibt entsprechend ihrem Ausgangsdatum im Ansatz Thompson unmittelbar nur die Sonnenfinsternisse, eine besondere Mondfinsternistafel würde, mit Verschiebung aller Daten um einen halben Monat, gleichartige Struktur haben. Es gilt jeweils für eine zu erwartende Finsternis einer der Tageswerte: für die Finsternisse am Anfang ihrer Reihe der unterste Tafelwert, für die Mitte der Reihe der mittlere Wert, für den Schluß der Reihe der oberste. Für die 69. = 0. Finsternisreihe zum Beispiel, die (im Ansatz Thompson) mit dem 8. November 755 beginnt, sind als die drei Tzolkindaten eingetragen: 1. das Tzolkindatum des 8. November 755: 12 Lamat; darüber 2. der vorhergehende Tag: 11 Manik; darüber 3. der wieder vorhergehende: 10 Cimi. Von den Oppolzerschen Sonnenfinsternissen der Reihe (siehe oben unter 2a) fielen die ersten fünf auf das 1. Tzolkindatum, die dann folgenden 15 (darunter alle im Mayagebiet sichtbaren) außergewöhnlich lange auf den vorhergehenden Tag, der Rest auf den 3. Tag (die allerletzte, isoliert stehende, die Erde im Süden nur noch eben streifende vom 19. September 1541 fiel noch einen Tzolkintag früher).

Aus der im Kodex vorliegenden Finsternistafel läßt sich unmittelbar im Schema entnehmen, an welcher Stelle ihrer Periodenreihe jede der 69 Tafelfinsternisse steht. Durch die 9 eingezeichneten Bilder, die jeweils den Tagesabstand von 148 Tagen hervorheben (das Schlußbild 10 zählt hier nicht mit), ist die ganze Tafel in 9 Gruppen zerlegt. In jeder dieser

9 Gruppen werden (auf die astronomische Finsternistheorie gehe ich nicht weiter ein) die Reihen der Finsternisse um so älter, je näher von rechts her das nächste Bild mit der 148 davor an sie herangerückt und entsprechend das Bild links fortgerückt ist. Die mit 148 Tagen Abstand getroffene Finsternis ist jeweils die jüngste der mit ihr beginnenden 177-Gruppe. Sie ist immer höchstens partiell und ganz selten oder nie im Mayagebiet sichtbar. Die Ausgangsfinsternis zum Beispiel, die 69. = 0., ist in der Tafel die fünferste und zugleich die drittletzte in ihrer Gruppe (die im ganzen 7 Finsternisse umfaßt). Das heißt: die Reihe 69 = 0, die am 8. November 755 nach der Theorie der Maya (im Ansatz Thompson) begann, läuft in der vorliegenden Tafel schon in der zweiten Hälfte ihrer Gültigkeit. In Betracht kommt also für sie schon seit einigen Perioden der zweite für sie angegebene Tzolkintag: 11 Manik. Teeple hat in seiner Table 8 (Maya Astronomy, p. 87f.) versuchsweise die Tafel angeschlossen an die Sonnenfinsternis des 16. Januar 1116: es ist die im Mayagebiet sichtbare Nr. 11 der Reihe (siehe oben unter 2a).

Genauere Untersuchung des ganzen Gefüges der Tafel in allen 9 Gruppen, verglichen mit den im Mayagebiet wirklich sichtbar gewesenen Finsternissen, wird den zeitlichen Gültigkeitsbereich der vorliegenden Tafel noch enger und schärfer umgrenzen. Daß die Tafel in sich in stetiger Verschiebung war (für 1 oder 2 oder höchstens 3 Perioden mag sie jeweils ungeändert genügend gute Vorhersagen ermöglichen), zeigt etwa der Schreibfehler in der Finsternis Nr. 26: als Tagesabstand steht noch das alte 177 verzeichnet, aber das folgende Bild, die Gesamtsumme oben, die drei Tzolkintage und die weitere Rechnung zeigen, daß die neue Reihe im Abstand von 148 Tagen, also einen Monat vorher, bereits eingesetzt ist. Die unsymmetrische Nr. 58 stellt desgleichen eine Stelle der letzten Verschiebung dar. Die 9 Bildchen mit dem Tageabstand 148 davor sind gewissermaßen die beweglichen, langsam nach links vorrückenden Schieber auf der Tafel — und vielleicht waren sie es in einer technischen Vorlage der Kodextafel in Wirklichkeit. Es war die Kunst der Mayaastronomen, durch richtiges Verschieben an den richtigen Stellen zur richtigen Zeit die Tafel fortlaufend mit der Himmelswirklichkeit in Übereinstimmung zu halten. Sie ist so genial angelegt, daß für Hunderte von Jahren jede einzelne überhaupt im Gebiet mögliche Finsternis und außerdem als nichtbeobachtbare, theoretische Finsternis jede andere auf den Tag genau bestimmbar und ablesbar war. Und jede etwaige Verbesserung der „Elemente“ auf Grund genauerer Beobachtung ließ sich — wie bei modernsten Tafeln — ohne weiteres in diese alte Mayatafel übertragen. — In der Anlage meiner mit heutiger astronomischer Kunst durchgerechneten „Mayafinsternisse“ (siehe unten S. 63) ist mir die Finsternistafel des Cod. Dresd. das Vorbild gewesen.

II. Der Umrechnungsansatz Spinden-Ludendorff.

Ich kann in diesem Abschnitt mich kürzer fassen. Meine letzte Aufgabe besteht hier nur noch darin, einige für den Laien nicht ganz deutliche Angaben im Schulzschen Aufsatz schärfer zu fassen und damit für die Entscheidung in ein anderes Licht zu rücken.

Mit dem Ansatz Goodman-Thompson-Teeple ergeben die drei Einleitungsdaten und vor allem das Hauptdatum der Dresdener Finsternistafel, die unbestritten Finsternisse darstellt, auf den Tag genau drei „Finsternisdaten“, an die das Kunstwerk der Tafel unmittelbar sich anschließen läßt. — Auch die Inschriften, soweit über ihren Inhalt Sicheres feststeht (vor allem die Supplementärserien), schließen sich glatt an.

Die wichtige Klammerbemerkung der Fußnote 2 auf S. 61 bei Schulz ist unvollständig: Von den errechneten Inschriftendaten, die oben auf der Seite in einer kleinen Tabelle zusammengestellt sind, trifft mit Ansatz Thompson nicht nur (wie Schulz angibt) das zweite, sondern ebenso das vierte und siebente (unter der Tabelle) eine Sonnenfinsternis (letztere sichtbar im Mayagebiet), und die übrigen vier liegen alle zu Oppolzerschen Finsternissen und in Mayafinsternisreihen so, wie das Hauptdatum der Dresdener Finsternistafel, das heißt, alle vier (Nr. 1 ist ja identisch mit diesem Hauptdatum) liegen im theoretischen Anfang von Sonnenfinsternisreihen, sind „irreale" Sonnenfinsternisse. — Ferner wird mit dem Goodman-Thompson-Teeple-Ansatz der Venustafel des Cod. Dresd. restlos Genüge getan. Die Darstellung bei Schulz (S. 58—59) ist sachlich einwandfrei und mag genügen, wenn auch gerade mit diesem Abschnitt des Aufsatzes nur der Fachmann etwas wird anfangen können. Hervorheben möchte ich den Satz: „Die addierten Zahlen stehen sämtlich auf den beiden obersten Reihen der Seite 24 des Dresden."

Und nun der Ansatz Spinden-Ludendorff! Schulz unterläßt es, hier das Material so vorzulegen, daß unmittelbare Einsicht in den Tatbestand möglich ist. Bei dem anderen Ansatz gab er an (Tafel I auf S. 52—54), daß man zu dem im Kodex überlieferten Datum nach Umrechnung 14 oder 15 oder 16 Tage addieren müsse, um den Tag der Mondfinsternis zu erhalten, der wahrscheinlich gemeint sei. Ebenso heißt es auf S. 59 im letzten Absatz: „Das Datum 9. 9. 9. 16. 0 liegt bei Thompson als Datum Venus-Morgenstern rund 17 Tage zu früh." Hier bei dem Ansatz Spinden sieht die Darstellung anders aus. Schulz bringt (S. 61 oben) eine kleine Tabelle mit Mayadaten und schreibt zu jedem ein europäisches Datum einer Mondfinsternis hinzu. Überschrift: „Bei Spindens Konkordanz ergibt sich folgende Aufstellung." Notiz dann einige Zeilen weiter im Text: „Ebenso entsprechen die julianischen Tage (d. h. das hinzugeschriebene europäische Datum) nicht unmittelbar der Spindenschen Konkordanz, sondern deren Umstellung auf zyklische Mondfinsternisse nach Ludendorff." Von den Lesern werden wenige wissen, daß nach Ludendorff in allen sechs Fällen der Tabelle von den Mayadaten 54 Tage zu subtrahieren sind, um jeweils die nächste, daneben geschriebene Mondfinsternis zu erhalten. Es wird auch nicht jeder ohne weiteres selbständig die Mayazahlen transkribieren und nach Spinden umrechnen, um die Differenz zu erfahren. Und daß das erste Datum der Tabelle zufällig auf derselben Seite einige 20 Zeilen später in ganz anderem Zusammenhang noch einmal vorkommt, diesmal mit der genauen Umrechnung, wird auch nicht jeder, der es merkt, richtig verwerten können. — Die sinnreiche, der Idee nach und im Ansatz Goodman in Wirklichkeit tagesgenau angelegte Finsternistafel des Cod. Dresd. wird im Ansatz Spinden durch die bei jeder einzelnen Rechnung zu wiederholende Ludendorffsche Konstante 54 zu einem schwerfälligsten Instrument (vgl. Ludendorff: Abhandlung Nr. 2, S. 6). Die gesamten über 200 Tzolkindatierungen der Tafel, wie sie dastehen, stimmen nicht mehr. Es ist undenkbar und ausgeschlossen, daß die Maya für Hunderte von Jahren aufs genaueste ihre Finsternisse berechnen konnten, wie die jetzt von mir bis in die Einzelheiten erklärte Tafel zeigt, und dann nach der Theorie Ludendorffs „zyklische" Abweichungen von 54 Tagen oder mehr in denselben Rechnungen mitführten. Weder im Kodex noch sonst irgendwo (außer in den Akademiearbeiten Ludendorffs) ist von dieser ersonnenen Fehlzahl auch nur die geringste Spur zu finden. Der Kodex enthält die wirkliche Finsternis- und Mondtheorie der Maya.

Auf S. 66 heißt es sodann bei Schulz von demselben Venusdatum, von dem bei dem anderen Umrechnungsansatz die rund 17 Tage Differenz

zwischen umgerechnetem Mayatag und astronomischer Wirklichkeit angegeben waren: „Bei Spindenscher Konkordanz bezieht sich das Datum 9. 9. 9. 16. 0 auf die obere Konjunktion der Venus." Das Mayadatum 9. 9. 9. 16. 0 ist nach Spinden gleich 11. April 363, die nächste obere Konjunktion der Venus (schnell entnommen den Willsonschen Tafeln, die auch Ludendorff in seiner Abhandlung Nr. 3, S. 6 als seine Hilfstafeln nennt) lag um den 6. Mai 363: das Mayadatum liegt also hier 25 Tage zu früh. Daß Schulz das Datum 9. 9. 9. 16. 0 der Venustafel mit der oberen Konjunktion der Venus in Verbindung bringt, ist für die Mayaforschung etwas Neues. Die weitere Rechnung bei Schulz zeigt, daß kein Schreibfehler vorliegt. Es war bisher doch wohl unbestritten, daß dieses Mayadatum hier das Ausgangsdatum der folgenden Venustafel ist und sich deshalb irgendwie auf Venus-Morgenstern (4 Tage nach der unteren Konjunktion) beziehen muß. Das Datum, umgerechnet nach Spinden, liegt aber reichlich 260 Tage später als der nächste Venus-Morgenstern. Ludendorff selbst weiß mit dem Datum an dieser Stelle nichts Rechtes anzufangen. In seiner Abhandlung Nr. 5 („Die Venustafel des Dresdener Kodex") schreibt er (1931) auf S. 6: Die Tzolkinbezeichnung nebst Maya-Monatsdatierung dieses Datums „spiele im Venuskalender (des Cod. Dresd.) eine Rolle", und es habe 4 Tage später ein Vollmond stattgefunden. Er gewinnt dann das erforderliche Ausgangsdatum der Tafel in komplizierterer Rechnung aus anderen Daten und Differenzen. Spinden selbst meint (1924) in seinem Buch „The Reduction of Mayan Dates", p. 176: „While the date 9. 9. 9. 16. 0 . . . in the Dresden Codex may be concerned with the Venus count in some fashion yet to be disclosed . . ." Schulz kommt von dem Datum in der Nähe der oberen Konjunktion auf die wegen der folgenden Tafel nötige untere Konjunktion, indem er eine Zahl addiert (13 „Kalenderringe" $= 13 \cdot 18980 = 246740$ Tage), die, so schreibt er, „auch in den Venusrechnungen der Stele C in Copan eine Rolle zu spielen scheint". In der Differenzentafel des Cod. Dresd. an dieser Stelle, die eine Reihe von (allerdings nur geraden) Vielfachen auch des „Kalenderringes" bringt, findet sich seine addierte Zahl nicht (vgl. oben die aus Schulz ausgeschriebene Bemerkung zu der Venusrechnung des Goodman-Ansatzes). „Die übrigen Reihen schließen sich entsprechend an", schließt Schulz diesen Abschnitt. Ich erkenne nicht, wie er sich das im einzelnen denkt. Der Gang der Rechnung auf S. 58—59 seines Aufsatzes, auf die er sich doch wohl bezieht, ist ein ganz anderer, als wie er hier möglich ist.

Die gleiche Zahl wie in der Venusrechnung braucht Schulz schon vorher in einer besonderen Finsternisrechnung (S. 61). Hier stützt er sich dafür auf eine 13 mal wiederholte Zahl 13 im Cod. Dresd., die als 13 „Kalenderringe", also $= 246740$ gedeutet werden könne. Ludendorff (Abhandlung Nr. 3, S. 10) liest (1931) diese 13 mal 13 näherliegend als $13^2 = 169$. Die Abweichung ist beträchtlich. Schulz hält es trotzdem für „sehr wahrscheinlich, daß die alten Maya dieses Datum wirklich gemeint haben". Ich gehe nicht weiter darauf ein.

Auf der vorhergehenden Seite (S. 60) beruft sich Schulz für seine neu geprägte „Mond-Determinante", durch die die Supplementärserien der Inschriften mit dem Ansatz Spinden in logische Übereinstimmung zu bringen wären, auf eine Stelle in Ludendorffs Abhandlung Nr. 4. An der angeführten Stelle lehnt Ludendorff (1931) eine Auffassung, wie sie jetzt Schulz vertritt, ausdrücklich ab (S. 25, vorletzter Absatz). Ludendorff selbst glaubt, wie bei den Finsternissen auch bei der Supplementärserie mit Annahme „zyklischer" Berechnungen, in denen eine im einzelnen Falle geringe Abweichung sich durch Häufung unkorrigiert vergrößert

habe, die Schwierigkeiten, die dem Ansatz Spinden hier erwachsen, beseitigt zu haben.

III. Vorläufiges Ergebnis und Aufgabe.

Ludendorff schloß eine seiner ersten Mayaabhandlungen, die Untersuchung über die Dresdener Finsternistafel, im Jahre 1931 mit der sehr sicheren Behauptung: „Die mit der Spindenschen in Konkurrenz stehende Goodmansche Korrelation versagt in diesem Falle völlig" (Abhandlung Nr. 3, S. 14). Und seine Venustafelarbeit (1931) kam zu dem Ergebnis: „Die Resultate der vorliegenden Arbeit zusammen mit denen meiner Arbeit Nr. 3 bilden einen überwältigenden Beweis für die Richtigkeit dieser Korrelation (Spindens)" (Abhandlung Nr. 5, S. 11). Auf der damit für ihn feststehenden Grundlage sind dann seine folgenden Arbeiten aufgebaut: sie übersetzen eine Reihe von Daten, die auf den Steininschriften überliefert sind, nach Spindenschem Ansatz in die europäische Zeitrechnung und untersuchen dann mit unseren heutigen Tafelhilfswerken die astronomischen Verhältnisse, vor allem die Planetenstellungen, der so gewonnenen Tage. Es ergibt sich bei diesen Konstellationsrechnungen für manchen der untersuchten Tage ein nicht alle Tage vorkommendes Himmelsbild. Je seltener das errechnete astronomische Ereignis, um so größer sei die Wahrscheinlichkeit, daß die Mayaastronomen wirklich in der Inschrift nichts anderes gemeint haben könnten. Ich schreibe den entscheidenden Satz heraus aus der im Sommer 1935 erschienenen Abhandlung Nr. 9, S. 30: „Auf Grund der Betrachtungen in diesem Abschnitt (§ 5. Wahrscheinlichkeitsbetrachtungen) können wir mit absoluter Gewißheit sagen, daß bei den Koinzidenzen der Daten unserer Inschrift mit astronomischen Phänomenen der Zufall keine ausschlaggebende Rolle gespielt haben kann. Damit haben wir aber wiederum einen Beweis der Spindenschen Korrelation geliefert, denn wenn diese falsch wäre, so würden ja eben alle jene Koinzidenzen einzig und allein dem Zufall zuzuschreiben sein."[1])

Wir können „mit absoluter Gewißheit" sagen: das einzige, was — außer der sicheren Transkription der Mayazahlen und einer Reihe chronologischer Zeichen — über den Sachinhalt der Mayainschriften und Kodizes bis jetzt sicher und unbestritten feststeht, sind die Venustafel und die Finsternistafel des Dresdener Kodex. Es wird noch vieles andere astronomischen Inhalts sein. Aber ganz allgemein bezeichnend für den Stand unseres Wissens und für die Methode, wie unsicher wir heute noch vorgehen müssen, ist der folgende beispielhafte Satz bei Ludendorff: „Die . . . dreimal vorkommende Hieroglyphe könnte sich vielleicht auf Merkur beziehen, da an der betreffenden Stelle (bei Ansatz Spinden) eine Rechnung über diesen Planeten vorliegt" (Abhandlung Nr. 9, S. 31). Die von Förstemann (vor 1900) und Meinshausen (1913) erkannten Dresdener Tafeln sind zwei astronomische Probiersteine für jeden Umrechnungsansatz. Der Ansatz Spinden-Ludendorff besteht, so wie ich es sehe, weder die eine noch die andere Probe. Der Ansatz Goodman-Thompson-Teeple hat beide Proben bestanden. Die Probe ist für ihn vollgültig, da er nicht konstruiert ist — so wenig wie der Ansatz Spinden — im Hinblick und mit Rücksicht auf die vorzunehmende Probe. Als er 1905 zuerst von Goodman aufge-

[1]) Nachtrag März 1937: Auch in der späteren Abhandlung Ludendorffs Nr. 10 vom März 1936 spielt die Wahrscheinlichkeitstheorie eine wichtige Rolle (S. 16ff. und S. 24ff.). Aber — ich kann heute das letzte Wort wagen: Der Ansatz Spinden bringt astronomisch nur Zufallstreffer. — Zusatz während der Druckdurchsicht (Juli 1937): Die am 23. April 1937 von der Preußischen Akademie der Wissenschaften ausgegebene Abhandlung Nr. 11, in der Ludendorff nochmals den Ansatz Spinden verteidigt, vermag das Urteil nicht zu ändern.

stellt wurde, wußte man noch nichts von der Finsternisliste. Und ihre letzten theoretischen Feinheiten sind erst jetzt enthüllt.

So ergibt sich die Aufgabe: Eine ähnliche, ins Einzelne der Inschriften gehende, breitangelegte Untersuchung, wie sie Ludendorff Schritt für Schritt für den Ansatz Spinden jetzt durchführt, ist für den Ansatz Goodman-Thompson-Teeple unerläßlich. Schon die ersten Proberechnungen dafür zeigten, eine wie große Rolle die Finsternisse bei den Maya spielten. Als astronomische Hilfstafel wurde deshalb von mir zunächst ein Kanon der Maya-Sonnen- und Mondfinsternisse vom Jahre 0 bis zur Spanierzeit berechnet. Er enthält sämtliche im Mayagebiet (und allgemein in Mittelamerika) sichtbar gewesenen Finsternisse nach Größe, Zeit und Dauer, geordnet in Mayaperioden. Die Mayadaten sind nach beiden Ansätzen durchgerechnet, die europäischen Daten julianisch und gregorianisch. Eine graphische Darstellung ermöglicht die einfache Interpolation auch der nicht sichtbar gewesenen sowie der für die theoretischen Mayareihen in Frage kommenden „irrealen" Finsternisse. Für die totalen Sonnenfinsternisse, soweit sie in Mittelamerika sichtbar waren, sind die Oppolzerschen Zentralitätskurven auf Übersichtskärtchen (je für 1 Mayaperiode 1 Karte) übertragen[1]).

Die eigentliche Untersuchung selbst wird erst in Jahren abgeschlossen sein. Aber bevor sie nicht geleistet ist, bleibt das Problem der Umrechnung der Mayadaten von der astronomischen Seite her zum mindesten in der Schwebe. — Spinden selbst versucht inzwischen neuerdings, seinen Mayaansatz auszuwerten für die noch nicht gelösten Geheimnisse auch der mexikanischen Kodizes. Siehe seinen Aufsatz: „Indian Manuscripts of Southern Mexico", in: Annual Report of the Smithsonian Institution for 1933 (Washington 1935), p. 429—451, besonders p. 447—449. Die chronologisch-astronomische Fragestellung ist im aztekisch-mexikanischen Kulturbezirk eine andere wie im Mayagebiet. Auch der von Schulz in seinem Schlußabschnitt angeführte Codex Tell.-Rem. hat deswegen mit dem Mayaproblem unmittelbar nichts zu tun.

[1]) Nachtrag März 1937: Die seit 1935 fertigen „Mayafinsternisse" sind noch nicht gedruckt. Im Druck werden die Mayadaten nach Spinden wegfallen, da der Ansatz Spinden nach meinen fortgeführten astronomischen Untersuchungen endgültig nicht mehr in Frage kommt.

Printed in Germany

A SUGGESTIVE MAYA INSCRIPTION

BY

CHARLES P. BOWDITCH

CAMBRIDGE
THE UNIVERSITY PRESS
1903

ERRATA.

A Method which may have been used by the Mayas in calculating Time, Cambridge, 1901.

Page 11, column 3, line 18. For 2. 6. 9. 0. 0. read 2. 7. 9. 0. 0.
" " " 19. " 2. 9. 1. 13. 0. " 2. 10. 1. 13. 0.

Notes on the Report of Teobert Maler in Memoirs of the Peabody Museum, Vol. II., No. I., Cambridge, 1901.

Page 3, line 26. The sentence beginning on this line should read: "If the date is 7 Muluc 12 Zac ⑯, it occurs in Katun 10 of Cycle 9 and its place is 54. 9. 10. 4. 13. 9. of Goodman's Tables, while 6 Muluc 12 Zac ㉘ occurs in 54. 9. 10. 16. 16. 9."

Notes on the Report of Teobert Maler in Memoirs of the Peabody Museum, Vol. II., No. II., Cambridge, 1903.

Page 14, line 28. For E 9 read E 8.
" 15, " 5 " E 9 " E 8.
" 15, " 8 " E 9 " E 8.
" 17, " 6 " Initial read Supplementary.

A SUGGESTIVE MAYA INSCRIPTION

With the regards of the author.

ERRATA.

BEEN USED BY THE MAYAS IN CALCULATING

3. For 2. 6. 9. 0. 0. read 2. 7. 9. 0. 0.
". " 2. 9. 1. 13. 0. " 2. 10. 1. 13. 0.

OBERT MALER IN MEMOIRS OF THE PEABODY
Cambridge, 1901.

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A SUGGESTIVE MAYA INSCRIPTION

BY

CHARLES P. BOWDITCH

1842-1921

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A SUGGESTIVE MAYA INSCRIPTION.

The Mayas had three methods of marking a fixed date. The first of these was accomplished by stating the name of one of the twenty days together with its number, and declaring it to be a given day of a given month. This fixed a day exactly within the limits of fifty-two years. The second method was by stating that between the given day and a date far in the past, a certain number of days had elapsed. The date in the past, from which the count was made, was called 4 Ahau 8 Cumhu. Almost all the Initial Series on the monuments of Central America show dates which are over 1,300,000 days from 4 Ahau 8 Cumhu. The system of numeration used by the Mayas to denote these large numbers was to a great extent vigesimal, and the periods so used have received the following names from many of the leading Americanists:

Kin,	1 day.
Uinal = 20 kins,	20 days.
Tun = 18 uinals = 360 kins,	360 days.
Katun = 20 tuns = 360 uinals = 7,200 kins,	7,200 days.
Cycle = 20 katuns = 400 tuns = 7,200 uinals = 144,000 kins,	144,000 days.

In the inscriptions apparently 13 cycles are needed to make one of the next higher term, while in the manuscripts 20 cycles are used to reach the next higher term. These periods are expressed on the inscriptions either by more or less geometrical forms or by faces, while the numbers which tell the number of the periods are expressed by either the line and dot method or by faces. In the manuscripts the terms of this series are usually shown simply by the position, the higher terms being above the lower ones. In this article I use the method by position,[1] except

[1] I omit the designation of the glyph called by Goodman the "grand cycle" glyph, as I think the evidence which we now have tends to disprove this meaning.

that instead of having the higher terms above the lower, the higher terms will be placed at the left of the lower; thus a date given as 9. 12. 2. 0. 16., means that 9 cycles of 144,000 days, 12 katuns of 7,200 days, 2 tuns of 360 days, 0 uinal, and 16 kins have passed. This is equal to a total of 1,383,136 days, and counting this from 4 Ahau 8 Cumhu, there can be but one day reached, which is 5 Cib 14 Yaxkin, a date which appears on two stelæ of Piedras Negras. In stating a date by this method the Mayas did not speak of a current period, but of a period elapsed.

The third method of fixing a given date is by using the first method given above and declaring that this date is in a given katun. As this date can only occur once in fifty-two years and as a katun extends over a period of less than twenty years, it is evident that a given date occurring in a given katun cannot occur twice in the same katun. Therefore such a day expressed as belonging to a given katun fixes that day with absolute certainty in a term of over seven hundred years. And more than this, if the date is stated as occupying a particular position in a given katun, as for instance the beginning day of a katun, such a combination will not occur again for many thousand years.

As is well known the inscriptions on monuments and buildings in Central America contain between forty and fifty Initial Series, in which a date is expressed by the first and second methods as given above. In addition to this, dates are often expressed in the inscriptions by the first and third methods given above, and this would be nearly as accurate a way of fixing a date as the combination of the first and second methods. The advantage of expressing dates by the first and second methods is that if any error should occur in carving either the day or month glyph or the number and period glyphs, one method would tend to correct the other.

Whether Dr. Seler's explanation of the meaning of this glyph is correct is still uncertain.

If it were possible to connect with certainty the date 4 Ahau 8 Cumhu, from which all these other dates are counted, with our own chronology, we could easily reach a clear knowledge of the dates on which these monuments were erected and these inscriptions were carved, always provided, however, that the dates so given are records of the dates of the erection of the monuments, or at least of the buildings in which the inscriptions are found; and this, I think, is now generally conceded to be the case in almost all instances. Where several dates are found on the same inscription, it will perhaps be safe to take the latest one as the date of erection of the monument or building. Although it may not be possible to connect these dates with our own chronology, it is certainly possible to make use of them to assign the time when these monuments were erected, and when the cities which contain them were flourishing, in relation to each other.

Omitting from consideration certain dates, which would seem to be traditional, or merely samples of mathematical calculations, I give in the following table the earliest and latest dates of most of the cities of Central America in which the dates can be deciphered with certainty.

Dates marked "A" are stated by combinations of the first and second methods; those marked "B" by a combination of the first and third methods:

	Earliest Date.	Latest Date.
Copan,[1]	A 9. 6. 10. 0. 0.	A 9. 16. 10. 0. 0.
Palenque {only sure Initial Series},	A 9. 8. 9. 13. 0.	B 9. 13. 0. 0. 0.
Piedras Negras,	A 9. 8. 10. 6. 16.	B 9. 14. 0. 0. 0.
Yaxchilan,	B 9. 8. 8. 4. 5. (?)	B 9. 17. 0. 0. 0.
Quirigua,	A 9. 14. 13. 4. 17.	A 9. 19. 13. 0. 12.(?)
Seibal,	B 10. 0. 0. 0. 0.	B 10. 1. 0. 0. 0.
Chichen Itza {only date known.},	A 10. 2. 9. 1. 9.	

[1] It is, of course, entirely possible that future discoveries will show dates earlier and later than those that are given here, and it may be, therefore, necessary to alter the views which are here expressed, if such discoveries are made.

The relative position of the cities can be seen by a glance at a map. The River Motagua flows in a northerly direction in Guatemala near the boundary between Guatemala and Honduras, and falls into the Caribbean Sea. At an elevation of 1700 feet above the sea and not far from the Motagua River and within the limits of Honduras, Copan is situated. Quirigua is in Guatemala near its eastern boundary and close to the Motagua River and about twenty-five miles from Copan as the crow flies.

The River Usumacinta also flows northerly, but it falls into the Bay of Campeche, a portion of the Gulf of Mexico. For a part of its course it forms the boundary between Guatemala and Mexico. Yaxchilan is on the Mexican side of this river, while Piedras Negras is farther down and is in Guatemala.

Palenque is in Mexico on a branch of the Usumacinta, and is much nearer the sea than the other cities. Higher up a large branch flows into the Usumacinta from the east; this is called the Rio de la Pasion; and on its south bank and directly south of Yucatan is Seibal. This ruin is in the northerly part of Guatemala. Tikal is in the very northeasterly corner of Guatemala, close to British Honduras, and almost exactly south of Bacalar in Yucatan, while northwest of Bacalar lies Chichen Itza. Tikal is about seventy or eighty miles from Seibal and on the direct road from that place to Bacalar, and nearly on the direct road to Chichen Itza.

The traditions of the Mayas were that a part of their ancestors came from a westerly direction. Let us see what possible migrations the dates which we have found suggest to us. Wherever they came from they were apparently settled in Copan in 9. 6. 10. 0. 0.; in Palenque in 9. 8. 9. 13. 0., and in Piedras Negras in 9. 8. 10. 6. 16., and in Yaxchilan in 9. 8. 8. 4. 5. It would seem as if the race had come from the south and west, and while one branch pressed along the mountain ranges to Copan, another had settled in

the Usumacinta Valley at Palenque, Piedras Negras, and Yaxchilan, certain dates of these three cities being less than one year apart. Copan extended itself along the river, and somewhere about 9. 14. 0. 0. 0. it may have sent forth a colony to Quirigua or may have decided to form a new settlement to which the whole city might move later. At all events we find no initial date later than 9. 16. 10. 0. 0. in Copan, while Quirigua flourished until nearly ten cycles had elapsed.

The latest date on the Usumacinta River is 9. 17. 0. 0. 0., while the latest date of Quirigua is 9. 19. 13. 0. 12., less than seven years before the end of the cycle, and it must have been about this time that the emigration northward occurred. Emigrants going from Quirigua to Lake Ysabal and up the Rivers Polochic and Cahabon would have easily reached the head-waters of the Pasion on which Seibal is situated, while a comparatively short land journey would have enabled the inhabitants of Piedras Negras and of Yaxchilan to reach the same place. From there a short journey would have brought them to the Island of Flores in Lake Peten, and another short journey would have taken them to Tikal, whence their march would extend to Bacalar and Chichen Itza. If this migration occurred, and if a date were to be found in Tikal, we should expect it to lie between 10. 0. 0. 0. 0., which is found in Seibal, and 10. 2. 9. 1. 9., found in Chichen Itza. In fact we find on a wooden carving, now in the Museum at Basel and taken from Tikal, a date given twice and reading 3 Ahau 3 Mol, and this date is found in 10. 0. 15. 8. 0. It is true that 3 Ahau 3 Mol is also found elsewhere, but the same date, 3 Ahau 3 Mol, is followed on the second carving by the glyph given in Fig. 2. Here the head is the well known cycle glyph, the lower part of the prefix is also well known as meaning zero, while the central part is clearly 15 and the upper part is unknown. This glyph may well mean that no katuns and 15 tuns are to be counted in the given

cycle, and this will fix the place of 3 Ahau 3 Mol beyond peradventure.[1]

I have attempted in my article on the "Age of the Maya Ruins," to show the possibility of agreement between the statements of the Books of Chilan Balam and the dates on some of the inscriptions. Following in the same line, we learn from the Book of Chilan Balam of Mani that in Ahau 6, the discovery of Ziyan caan or Bakhalal took place.[2] This is clearly the same as Bacalar. We learn also that they ruled in Bakhalal for about sixty years, until Ahau 13, and while they ruled there Chichen Itza was discovered. At the latter place they ruled for about 120 years or until Ahau 1. It must be remembered that the ahaus, which, as given here, are the same as katuns, are numbered 13. 11. 9. 7. 5. 3. 1. 12. 10. 8. 6. 4. 2. 13., etc.

The Book of Chilan Balam of Tizimin relates that in Ahau 8, about twenty years before Ahau 6, Chichen Itza was "learned about" and that the "discovery of the province of Zian took place." This book also states that in Ahau 13 "Pop was counted in order," and that in Ahau 1 Chichen Itza was destroyed after a residence of 120 years there. The Book of Chilan Balam of Chumayel states that in Ahau 6 Chichen Itza was discovered, that in Ahau 13 "Pop was set in order," and that in Ahau 10 Chichen Itza was abandoned. (This is forty years after the date fixed by the Book of Tizimin.) In spite of the discrepancies in these accounts, it seems clear enough that the emigrants reached Bacalar or Bakhalal before they came to Chichen Itza. Their earlier wanderings are also set forth in these books, and while the location of Tula, Chacnouitan, and the earlier cities cannot be absolutely determined, the names of Bacalar and Chichen Itza are well known.

[1] I think that this is a far more probable date than that suggested by Seler in his valuable article on Tikal published in the "Zeitschrift für Ethnologie," January, 1901.

[2] See "The Maya Chronicles," by Dr. Daniel G. Brinton.

If, then, they journeyed from Seibal to Tikal and thence to Bacalar, the date of 3 Ahau 3 Mol, 10. 0. 15. 8. 0., is a probably accurate one.

Another proof, however, is found to support this opinion. As has been seen, the Books of Tizimin and Chumayel state that "Pop was set in order" about this time. Pop was the first month of the year, and as Bishop Landa states, the year began in his time on the 16th of July. It is evident that if no intercalary days were added or if the right number were not added, the year dates would no longer agree with the seasons, and after long wanderings it would be very probable that Pop, or the beginning of the year, would need to be "set in order."

The method adopted by the Mayas for making their dates correspond with the seasons is not clearly or definitely stated anywhere. Bishop Landa says, "Tienen su año perfecto como el nuestro de CCC y LXV dias y VI horas. . . . Destas seis horas se hazian cada quatros años un dia y assi tenian de quatro en quatro años el año de CCCLXVI dias." The manuscripts do not seem to show this. Pages 46–50 of the Dresden Codex would seem to show that for 104 years no such addition was made, unless it was done without giving a name, or number, or a place in the month to the intercalated days. And the count of cycles, katuns, etc., on the inscriptions is to the same effect. It is certainly possible that as the count of time was of little importance to the common people who received from their priests and leaders their orders about ceremonies, planting, harvesting, etc., the day and month count, and the cycle and katun count were allowed to run along without change and that the priests kept an account of the extra days which had been added, or would have to be added, in order to keep their reckoning of days and seasons in accord. In this case every now and then the priests would have to make these calculations and find out just where they were in reference to the seasons.

Cogolludo,[1] Libro IV, Capitulo 5, says, "Contaban los años con trescientos sesenta y cinco dias divididos por meses de á veinte dias correspondiendo á los nuestros. . . . A diez y siete de Julio comenzaba el mes llamado Poop. . . ."

And we find the following statement made by Aguilar,[2] in the "Anales del Museo Nacional de Mexico," Tomo VI, page 95: "Contavan los años por Lunas de 365 dias como nosotros tambien. Contavan el año solar por meses de veinte dias, con seis dias de Caniculares, correspondiendo a nuestros meses por este orden . . . a 17 de Julio Poop. . . . Esta quenta de diez y ocho meses y los seis dias de Caniculares son los mismos 365 de nuestro año solar. . . . Assi ni mas ni menos usavan, y usan estos Indios sus refrancillos in estos 18 meses, y seis dias de Caniculares para sembrar y mirar por su salud, y curarse como nosotros en Verano, Estio, Otoño y Invierno."

The Mexican system of intercalation is also doubtful. Many authors think that the Mexicans added one day every fourth year; others that they added thirteen days at the end of every fifty-two years, while Leon y Gama in speaking of the intercalation of days every fifty-two years writes, on pages 52 and 53 of "Los Dos Piedras," as follows: "Dije aquellos 12 ó 13 dias, porque efectivamente un año intercalaban 12, y otro 13 dias; ó lo que es lo mismo, doce dias y medio en cada uno, ó 25 en el doble periodo nombrado Cehuehuetiliztli, que constaba de 104 años, como se ha dicho antes; empezando a contar los dias intercalares, en el primer ciclo, desde la media noche . . . de manera que todos los dias del primer ciclo se contaban desde la media noche, y todos del segundo desde el medio dia; . . . con lo qual quedaban intercalados los 25 dias en el periodo mayor, ó doble ciclo de

[1] Cogolludo was a priest of the order of St. Francis, and took the habit on March 31st, 1629.

[2] Aguilar was a native of Valladolid in Yucatan. He studied in Mexico, and in 1588 received a doctor's degree from the college Santa Maria de Todos Santos.

104 años." Orosco y Berra thinks that they divided each 260 years into five sets of fifty-two years each, and that they added the intercalary days thus: 13, 12, 13, 12, 13. He refers to the Codex Borgia for the proof of this, but the passage hardly bears out his view. Humboldt follows Leon y Gama.

The Mexican and Maya calendars were constructed on practically the same principle, and it is hardly possible that the Mexicans, who were not as advanced as the Mayas in their general knowledge, could have surpassed them in the accuracy of their calculations of the needed intercalation of days. It is, therefore, very probable that we shall gain some knowledge of the method used by the Mayas in the use of their days by considering the Mexican method.

The inscription of Tikal, Fig. 1,[1] gives, in my opinion, some evidence of the system used by the Mayas. Bear in mind that about this time "Pop was set in order." On the inscription we find Glyphs 1 and 2, meaning 3 Ahau 3 Mol, which we have decided to be the date . . . . . 10. 0. 15. 8. 0.

Glyphs 4 and 5 give the distance for 3 Ahau 3 Mol to 6 Eb 0 Pop . . . . . 2. 11. 12.

Glyphs 6 and 7 give 6 Eb 0 Pop,[2] which would then be . . . . . 10. 0. 18. 1. 12.

10. 0. 18. 1. 12 = 1,446,512 days = 3963 years and 17 days.

3963 years = 38 × 104 years + 11 years.

[1] Maudslay, in his "Biologia Centrali-Americana," shows the number 4 attached to the tun sign in Glyph 5 of this inscription, but a reference to Plate 12 of the "Compte rendu d'une mission scientifique en Espagne et en Portugal," par Léon de Rosny, Paris, 1882, will show that the number is 2.

[2] Dr. Seler chooses to consider that the glyph before Pop means the "day before," but I know of no authority for this except the unwillingness of Dr. Seler to follow Mr. Goodman's suggestion that the days of the month were numbered from 0 to 19 — a suggestion which I think is supported by the facts in the case. In other words, I think the evidence is very strong in favor of the theory that the Mayas counted the days of their months — not as current days, but as days elapsed, as they did their cycles, katuns, tuns, uinals, and kins, and as we do our hours and minutes. Our astronomers use 0 hours 0 minutes in stating their observations.

If we consider that the Mayas allowed twenty-five days every 104 years, as is stated by Leon y Gama to be the system of the Mexicans, and one day for each four years on the shorter period, we should find that they would have to allow for this long period $38 \times 25 + 2 \times 1$ or 952 days in all. This is the exact number given on Glyphs 4 and 5, where 2. 11. 12. are noted.

Two methods are possible for intercalating these 952 days without disturbing the count.

One of these would be to follow our own method, by which we insert an extra day between the 28th of February and the 1st of March, which usually come together, and which on leap years are separated by the 29th of February. The inscription seems to show that this method was known by the Mayas, for, while Glyphs 6 and 7 give us 6 Eb 0 Pop, Glyph 13 is 1 Kin, the kin sign being placed between the open jaws made by Caban as the lower jaw and an unknown glyph as the upper jaw, and the date 7 Ben 1 Pop, the next day to 6 Eb 0 Pop appears on Glyphs 14 and 15. It is not impossible that Glyphs 8 to 12 may describe this method. This particular form of 1 Kin occurs very seldom in the manuscripts.

But there was another method of intercalation and this was to follow the Roman custom. The Romans simply counted the sixth of the Kalends of March over again, calling the day the bisextile. If then on reaching 6 Eb 0 Pop, the Mayas decided to follow this plan, they would have counted back 952 days to 3 Ahau 3 Mol or, what is the same thing, they would have given to 6 Eb 0 Pop the name of 3 Ahau 3 Mol, and would have begun counting the days between over again. When in doing this they had reached 6 Eb 0 Pop again, the tropical year and the calendar would have been found to be nearly in accord.

It has been suggested, however, that this may have been done simply as a record, and that there may have been no attempt to

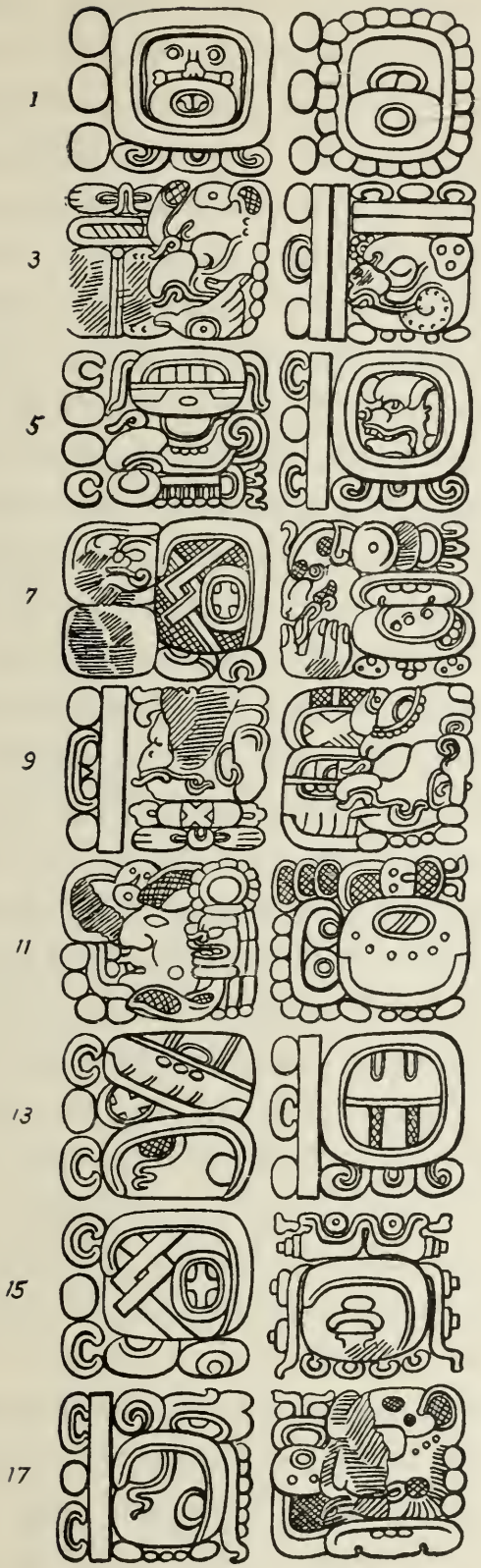

FIG. 1.

FIG. 2.

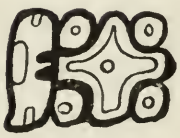

FIG. 3.

FIG. 4.

FIG. 5.

carry out the correction in a practical way; but I think it probable that they actually carried out this correction, and that this record of Tikal may be paraphrased in this way: "We have now reached the day 6 Eb 0 Pop, which should be the beginning of the year and the sun should be returning from its northward course, but instead of this it has not reached the end of its winter course towards the south. We should have added 25 days each 104 years since the beginning of time, or since 4 Ahau 8 Cumhu, and 1 day for each four years of the remaining years. This would have amounted to 952 days and we can add them now, if we wish. If we count the next 952 days without giving them number or name, the 953d will then be 1 Pop, but this will be a very cumbersome method, for how shall we be able to tell where we are with so many days without name or number? What we had better do is to count back 952 days to 3 Ahau 3 Mol and begin to count these days over again, so that when we reach 6 Eb 0 Pop again, we shall find the sun again coming back from his northerly journey."

As I have said before, we actually find the date 6 Eb 0 Pop, the 952 days which are needed to be intercalated, and the date 3 Ahau 3 Mol 952 days before 6 Eb 0 Pop, on the Tikal inscription. The date 3 Ahau 3 Mol would then be the beginning of the intercalated days, which were to be counted over. The prefix to Pop is somewhat blurred in Glyph 7, and it may be objected that this glyph may not mean 0 and is, therefore, not the beginning day; but such an objection is unsound, for in Glyph 13 we find a glyph for 1 kin or 1 day, and in Glyphs 14 and 15 is the date 7 Ben 1 Pop, just one day in advance of the last one.

It is interesting also to see that 160 days before 3 Ahau 3 Mol, or on the date 10. 0. 15. 0. 0., the total number of days equal to 1,445,400 had passed. This equals 3960 years of 365 days each, or eleven times 360 years. It also equals 2475 times 584 days,

which is almost exactly the time of a synodical revolution of Venus. The date, then, must have been a significant one to the Mayas, since not only an exact number of years of 365 days each had passed, but this number was just eleven times 360 of such years. But an exact number of Venus revolutions had also passed. It would be wise, therefore, to look for a rectification of the Venus revolutions as well as for a rectification of the calendar, especially as in Glyph 16 we find the Venus symbol. The fact that the Mayas understood that a revolution of Venus was completed in 584 days needs no demonstration to a student who has carefully examined pages 46 to 50 of the Dresden Codex, where the glyphs of Venus, Figs. 3 and 4, are clearly marked. But if the Mayas had this knowledge and if they had made astronomical observations for a long number of years, they would naturally not only have known that the year of 365 days did not coincide with the tropical year, but also that the revolution of Venus was not exactly 584 days. The synodical revolution of Venus is really 583.92 days or $\frac{8}{100}$ of a day less than 584 days. The Mayas, of course, had no decimal system, and if they made any correction they would be likely to express it in a fraction with 1 for its numerator. As a matter of fact $\frac{1}{12}$ of a day is a very close approximation to $\frac{8}{100}$, and it would be natural for them to have decided that the correction should be made at the rate of one day in each twelve Venus revolutions. When 6 Eb 0 Pop had been reached there would have passed 1,446,512 days, or 2476 revolutions of Venus, and 528 days additional. If, then, in the correction of the calendar, they had called 6 Eb 0 Pop, 3 Ahau 3 Mol, and had again counted these days a second time, when they reached 6 Eb 0 Pop again, 952 additional days would have passed. This added on to 2476 Venus revolutions and 528 days would have made 2478 revolutions and 312 days. If now we carry out the correction of the Venus revolution, by dividing the

number of revolutions by twelve, we should have $206\frac{1}{2}$ days, or say 207 days, over which the Venus revolution had progressed beyond the distance to which the calculation of 584 days to a revolution had carried us. That is, on reaching 6 Eb 0 Pop a second time, 2478 revolutions would have passed and 519 days of the next revolution. This being the case, we find on the inscription in Glyph 13 one day marked, and in Glyphs 14 and 15 the date 7 Ben 1 Pop. On this date, then, 2478 revolutions and 520 days had passed. In Glyph 16 Fig. 5 occurs. And here we find as a superfix the Venus symbol, which we have seen so frequently on pages 46 to 50 of the Dresden Codex. Some calculation about Venus is surely going on, and when in Glyph 17 we find the date 6 Caban, and find that this date is just sixty-four days from 7 Ben 1 Pop, and further find that by adding this sixty-four days to the 520 days which had passed on the additional revolution of Venus it just completes this revolution, it would seem that there can be hardly any doubt that this was intended. In other words, on the day 6 Caban given in Glyph 17, 2479 Venus revolutions were exactly finished.

It may be objected that the methods adopted by the Mayas for correcting their calendar and the revolutions of Venus are not absolutely correct, and that, therefore, any such corrections would not have brought about a proper accordance of the calendar with the seasons and with the position of Venus. It is true that the methods are not exactly correct, but we have here an instance of where two mistakes have actually rectified each other as far as the name of the day is concerned. At the time when the date 6 Eb 0 Pop, or 10. 0. 18. 1. 12., first appears, 1,446,512 days had passed, or, on the basis of 365 days to the year, 3963 years and 17 days. The number of days to be intercalated under the Gregorian system would have been 960, and if we suppose that the Mayas went back 960 days and then counted these days over a second time, when

they had reached 6 Eb 0 Pop for the second time the additional 960 days would have been counted and the beginning of the year would have taken its proper place with the seasons. At this time the number of revolutions of Venus which had passed would be 2478.55, the new revolution having advanced 320 days. On the basis that the Venus revolution actually consisted of 583.92 days instead of 584 days, we should find that Venus had advanced $\frac{8}{100}$ of a day further for each revolution. This would have amounted to the sum of 198.28 days in the number of revolutions just given. Adding this number to 320, we have 518.28 days which the new revolution had passed through when 6 Eb 0 Pop occurred for the second time. The manuscripts then give one day and then state a date, which is sixty-four days farther in advance. Adding these two sums to 518.28 we get 583.28, whereas an additional revolution of Venus would have been 583.92, thus showing that in spite of the errors in the calculations of the Mayas, the Venus revolution would have ended on a day 6 Caban, the difference in the two calculations being less than a single day.

The Tikal inscription is, therefore, in my opinion, very strong evidence in support of the following views, viz.:

1. That astronomy is one of the subjects of which the inscriptions treat.

2. That the truth of the records of Chilan Balam is confirmed by the inscriptions, both in regard to the correction of the calendar and the migrations of the Maya races.

3. That the Mayas did correct their calendar shortly before their arrival at Chichen Itza and that at the same time they corrected their observations of the synodical revolution of Venus.

4. That the Mayas intercalated or at least calculated the intercalation of twenty-five days each 104 years, and allowed one day for each four years during portions of those periods.

If it should be found that several of the inscriptions are really calculations of the corrections which are needed in the calendar and in the synodical revolution of Venus, it may throw some light upon the table on page 24 of the Dresden Codex, where the number 2920 (or 8 × 365, or 5 × 584) is the difference used, and which, together with many others of similar tables, I have for a long time regarded as multiplication tables, whatever they may be besides. But now we may find that it is also a division table in which the division takes place through subtraction.

For instance, supposing it was desired to find out how many times 2920, the common multiple of 365 and 584, appears in the date we have been discussing: 10. 0. 15. 8. 0., and that we know that 9. 9. 16. 0. 0. found in the second column equals 72 periods of 52 years, or 36 periods of 104 years, or 468 times 8 years.

From	10. 0. 15. 8. 0.	
we will deduct	9. 9. 16. 0. 0.	= 468 × 8 years,
leaving	10. 19. 8. 0.	
Again deducting the number found in the centre row of the page,	4. 17. 6. 0.	= 12 × 8 years,
there is left	6. 2. 2. 0.	
Again deducting	4. 17. 6. 0.	= 12 × 8 years,
leaving	1. 4. 14. 0.	
Again deducting the number found in the fifth row of the page,	1. 4. 6. 0.	= 3 × 8 years,
there is left	8. 0.	
We have then a total of		495 × 8 years,
		or of 495 × 5 Venus revolutions.

We find, then, that 10. 0. 15. 8. 0. = 495 × 2920 + 160 days. This, then, equals 8 × 495 = 3960 solar years of 365 days plus 160 days, or 2475 synodical revolutions of Venus plus 160 days, or putting this same result in the Maya form, 10. 0. 15. 8. 0. = 11. 0. 0. revolutions of the earth around the sun plus 160 days, or 6. 15. 15. synodical revolutions of Venus plus 160 days, as we found before.

WAS THE BEGINNING DAY OF THE MAYA MONTH NUMBERED ZERO (OR TWENTY) OR ONE?

BY

CHARLES P. BOWDITCH

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GOODMAN, in his elaborate and valuable book on the Maya Inscriptions, has made up his Tables on the supposition that the beginning day of the month was not called Day 1, but Day 20, giving the day this number because in his view the Mayas counted the number of days which had passed and not the current or passing day. That is, the Mayas, according to Goodman, used the same plan in counting their days which we use in counting our minutes and hours and which we depart from in counting our days. Thus, when we speak of January 1, we do not mean that one day has passed since January came in, but that the month of December has passed and that we are living in the day which when completed will be the first day of January. But when we say that it is one o'clock, we do not mean that we are living in the hour which when passed will be the first hour of the day or half-day, but we mean that one whole hour of the day or half-day has fully passed. Goodman's idea is that the Mayas used this system in counting their days of the month, their kins, uinals, tuns, katuns, and cycles. In other words he considers that the beginning day of the month Pop was not 1 Pop, but 20 Pop, the beginning day of Uo was 20 Uo; that the beginning kin of a uinal was Kin 20, the beginning uinal of a tun was Uinal 18, the beginning tun of a katun was Tun 20, that the beginning katun of a cycle was Katun 20, and that the beginning cycle of a grand cycle was Cycle 13. The reason why Goodman substitutes 18 and 13 for 20 in the case of the uinals and cycles respectively is that these are the numbers of uinals and cycles which are needed to make one of the next higher units in his scale of numeration.

Without considering the truth or error of his view in regard to the cycles, katuns, etc., let us try to solve the following questions:

1st. Did the Mayas count the days of their month by the day which had passed, as we count our hours?

2d. Was the number which they gave to the beginning day of the month 0 or 20?

For our answers to these questions, let us turn to pages 46–50 of the Dresden Codex. These pages contain three rows of twenty month dates each, and each of these dates is reached with but two exceptions by counting forward from the preceding date the number of days specified in red at the bottom of the pages, the first date of each row on page 46 being the regular number of days distant from the last date of the same row on page 50.

In the first row of dates, we find that the third date on page 48 is 12 Chen. The number of days at the bottom of the page which need to be counted forward in order to reach the fourth date is 8. If the beginning day of the month were marked by the Mayas with 1, then the last day would be marked with 20, and by adding 8 days to 12 Chen, we should reach 20 Chen. But the date is not 20 Chen. The month is Yax, — the month immediately following Chen, — and the glyph which takes the place of the number has a form resembling two half-circles placed side by side. In other words, in this case 8 days from 12 Chen reach ? Yax, and as far as the first proposition is concerned, it is immaterial whether the form above given is called 0 or 20. Eight days have taken us out of the month Chen into the next month Yax, and to a day of that month which is not 1 Yax, but must be a day preceding 1 Yax, whether that is called 0 Yax or 20 Yax.

Again, the first date of the first row of month dates on page 50 is 10 Kankin, and the number at the bottom of the page to be added in order to reach the second date is 90. Counting forward 90 days from 10 Kankin we should reach 20 Cumhu, if the begin-

ning day of the month is 1 Cumhu. But the month is not Cumhu nor is it Pop, but it is undoubtedly the glyph for the five supplementary days, Uayeb. The glyph which takes the place of the number is the same as that which has just been found before Yax. This is additional evidence that the months began with 0 or 20 and not with 1.

Again, on the first date of the second row of page 50 is 15 Cumhu, and the number of days to be added in order to reach the next date is 90, which appears at the bottom of the page. Counting forward this number of days from 15 Cumhu, we should reach 20 Zotz if the beginning day of the month were 1 Zotz. But the month is clearly Tzec, and the number is that which we have already found twice before as meaning 0 or 20.

These cases would seem to show that after passing day 19 of any month, we reach the beginning day of the next month, and that this day is found with the glyph which means 0 or 20.

Against this is the evidence of the last month date of the third row of page 49, which is clearly 9 Mac, and the number to be added at the bottom of the page is 236. This would take us to 20 Xul, if the beginning day of Xul is 1 Xul, but to 0 or 20 Yaxkin if the beginning day of Xul is 0 or 20. The first month date of the third row of page 50 is 0 or 20 Xul. This, I think, is clear, although the Xul glyph is not exactly like the other glyphs of this month.

Here then are three cases which support Goodman's view and one against it. The weight of evidence is therefore in favor of his system so far.

In the Inscriptions there are not very many cases where the month has the zero or twenty sign attached to it, and there are still fewer cases where this occurs in a position where the question can be decided from the context as to whether the 0 or 20 is the last day of one month or the beginning day of the next month.

On the inscription of the Temple of the Cross at Palenque, however, we have a month date which is 5 Ahau 3 Tzec. This is on R S 10. On R 8 to 9 we find 1 . 16 . 7 . 17 ., if the thumb with the katun glyph means 1, as it almost surely does. Counting forward this number of days from 5 Ahau 3 Tzec, we should reach 5 Caban 20 Zip if the month begins with 1, or 5 Caban 0 or 20 Zotz if the beginning day is 0 or 20. On S 12 R 13 is 5 Caban 0 or 20 Zotz. The form of the number glyph cannot fail to recall that of the similar glyphs in the Dresden Codex.

De Rosny has given in his "Compte-Rendu d'une Mission Scientifique," published in the "Mémoires de la Société d'Ethnographie," an admirable reproduction of the wooden inscription which came from Tikal. On Plate 12 of this work we find on A B 1, 3 Ahau 3 Mol, and on B 2 A 3, we have 2 . 11 . 12. By counting forward this number of days from 3 Ahau 3 Mol we reach 6 Eb 0 or 20 Pop, if the month begins with 0 or 20, but 6 Eb 5 Uayeb if the month begins with 1. This is a particularly strong case, for the month is surely Pop and the number is certainly not 5, and is like those of the manuscripts and of the Temple of the Cross, which we have just commented on and which are in all probability 0 or 20.

Again, on a part of a doorway in El Cayo, on C D 3 we find 13 Cimi 19 Zotz; on H 3 G 4 is a number which seems to be 8 . 18 . 6. Counting forward we reach 9 Eb 20 Uo, if the month begins with 1, or 9 Eb 0 or 20 Zip, if the months begin with 0 or 20. Although the glyphs for Uo and Zip resemble each other, yet the date on I J 1 is clearly 9 Eb 0 or 20 Zip. It should be said, however, that the number on H 3 G 4 is somewhat effaced and very unusual, in showing 18 uinals, and that there is another date 5 ? 3 Yaxkin on E F 3.

On the other hand the inscription of the Temple of the Cross shows us on D 3 C 4, 4 Ahau 8 Cumhu, and on D 5 C 6, is 1 . 9 . 2 .,

which is equal to 1 year 177 days. Counting forward this number of days from 4 Ahau 8 Cumhu we reach 13 Ik 20 Mol, if the month begins with 1, or 0 or 20 Chen, if the month begins with 0 or 20. On C D 9 we find 13 Ik ? Mol. However, on D 13 to C 15 we have the long number 1 . 18 . 3 . 12 . 0., which counted forward from 13 Ik 20 Mol brings us to 9 Ik 15 Zac, which is not found anywhere near by. But if we count forward this number from 13 Ik 0 or 20 Chen, we should reach 9 Ik 15 Ceh, which is found on E F 1. It would seem, therefore, that the glyph for Mol had been carved in error for that of Chen.

Other cases where 0 or 20 probably occur before the month sign are the following:

Copan,	Altar U, 1 to 2	2 Caban 0 or 20 Pop.
"	" U, 51 to 52	3 Eb 0 or 20 Pop.
Temple of the Cross,	Q 2 P 3	11 Caban 0 or 20 Pop.
" " "	F 12 E 13	9 Ik 0 or 20 Chen (J. T. G.)
" " "	E F 9	9 Ik 0 or 20 Yax or Zac.

The month glyph of the last example looks like Zac. If it is Yax it proves Goodman's theory by calculation.

Thus we see that in three out of four cases in the Dresden Codex and in three cases out of four in the Inscriptions where the context is such as to throw light on the question, the evidence is in favor of concluding that the months began with a day 0 or 20 and not with a day 1. Moreover in the single case in the Codex which tends to prove the contrary, it is interesting to see that the month glyph, Xul, is somewhat different from the other Xul glyphs, while in the doubtful case in the inscriptions, if the month glyph had been Chen and not Mol, it would have agreed with the dates before and after it. In other words, the calculations both before and after the date in question would be quite accurate if the month were Chen and if, therefore, the beginning day were 0 or 20,

while the glyph of Mol makes the calculation after that date inaccurate.

All the evidence taken gives a very strong presumption in favor of Goodman's theory that the month began with 0 or 20.

It is also interesting to notice that of the other dates given above where the calculation does not help us, three of these are 0 or 20 Pop (provided we have identified the number glyph correctly, which is certainly none of the known glyphs for any of the numbers 1 to 19). This date would not be significant if 20 Pop were the last day of the month, but it would be very significant if it were the beginning day of the month, that is the beginning day of the New Year. I think, therefore, that it is safe to assume as a good working hypothesis that the beginning days of the month were designated as 0 or 20, and the last day of the month as 19.

The second of our questions, — namely, whether this beginning day was called Day 0 or Day 20, — must now be taken up. Of course if we had decided that those cases which we have been considering represented the last days of the month, there would have been no question that the number glyphs which were not any of the numbers from 1 to 19 must be the number 20. It would have been very improbable that after having numbered the days of a month from 1 to 19 they would have called the last day 0. But it is not as certain that they might not have called the beginning day of a month 20, considering that twenty days had passed of the preceding month, and that their count was regulated by the number of days which had passed. As far as the month dates are concerned, however, it is absolutely unimportant whether the beginning day is called 0 or 20. Goodman says that the Mayas had no need of a zero (following the Romans in this respect), since zero was of no use as a multiplier. This is hardly conclusive. It may be true, as Goodman says, that the Mayas in their month

dates spoke of the twenty days which had passed in the preceding month; but it is equally true that they may have expressed this idea by attaching the number zero to the beginning day on the ground that no days of the current month had elapsed. Indeed the latter explanation is the more credible, since, if they had spoken of the twenty days of the preceding month as having elapsed, it would seem possible at least, and perhaps probable, that they would have used the name of the preceding month as well, and would have called the beginning day of Yaxkin, for instance, 20 Xul and not 20 Yaxkin. But this it seems they did not do, unless the instance on the Temple of the Cross and that of the Dresden Codex, already cited, would bear this construction. These instances, however, are contradicted by all the other cases and are themselves capable of a different interpretation. It would seem as if the Mayas probably called the beginning day of a month by the name of the current month, and that they attached the zero to it, meaning that no days of that month had elapsed. Moreover such a plan is very much easier for calculation and there is less liability to error; for it is natural to think of a day with the number 20 as following a day with the number 19 and as being the last day of a month containing 20 days, rather than the beginning day of a month. I do not place too much reliance on this, however, for it is hardly safe to argue back from what we at this time would consider the best thing to do, in order to find out what some other nation at some other time would have done.

The chief evidence in favor of giving the 0 or 20 glyph the meaning of 20 is, that this glyph is often drawn with a hand stretching across its lower part, especially when the main part of the glyph is a face. Now the face glyphs which represent the cycle of 144,000 days and the katun of 7,200 days are very similar, except that the cycle glyph has also a hand across its lower part, and the cycle is equal to 20 katuns; but this evidence

is somewhat weak, since it is clear that even if the 0 or 20 glyph should be decided to mean 20, in all calculations it is to be treated as 0, as is proved by many of the inscriptions of Palenque, Piedras Negras, Copan, and elsewhere.

On the whole, therefore, I think the weight of evidence is in favor of the hypothesis that the Mayas called the beginning days of their month Day 0 and numbered the days of their month from 0 to 19.

MEMORANDA ON THE MAYA CALENDARS USED IN THE BOOKS OF CHILAN-BALAM

BY

CHARLES P. BOWDITCH

(From the American Anthropologist (N. S.), Vol. 3, January-March, 1901)

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1901

MEMORANDA ON THE MAYA CALENDARS USED IN ? CHILAN BALAM

; P. BOWDITCH

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With the regards of the author.

MEMORANDA ON THE MAYA CALENDARS USED IN THE BOOKS OF CHILAN BALAM

By CHARLES P. BOWDITCH

Dr Brinton, in his *Maya Chronicles*, has translated the following passages from the Book of Chilan Balam of Mani:

. . . in the thirteenth Ahau Ahpula died; for six years the count of the thirteenth Ahau will not be ended; the count of the year was toward the East, the month Pop began with (the day) fourth Kan; the eighteenth day of the month Zip (that is) 9 Ymix, was the day on which Ahpula died; and that the count may be known in numbers and years, it was the year 1536.

And again from the Book of Chilan Balam of Tizimin:

The thirteenth Ahau; the death of Ahpulha took place; it was the sixth year when ended the count of the thirteenth Ahau,—the count of the year was from the east (the month) Pop passed on the fourth Kan; on the eighteenth of (the month) Zip, 9 Imix was the day Ahpulha died; it was the year 1536.

In his remarks on these books Dr Brinton says:

According to the reckoning as it now stands, six complete great cycles were counted, and parts of two others, so that the native at the time of the Conquest would have had eight great cycles to distinguish apart.

I have not found any clear explanation how this was accomplished. We do not even know what name was given to this great cycle,[1] nor whether the calendar was sufficiently perfected to prevent confusion in dates in the remote past.

It would seem, however, as if the reckoning of time as given in these books is very accurate, fixing a date which would not be

[1] It should be noted that the grand cycle, which Dr Brinton refers to, is the period of 13 x 7200 days = 93,600 days or 260 periods of 360 days; while the grand cycle according to Goodman's method is 13 x 144,000 days or 5200 periods of 360 days.

duplicated within a limit of thirty-five hundred or four thousand years.

The Books of Chilan Balam number the katuns on a different principle from that used on the inscriptions or in the Dresden Codex, but the two methods can be readily and usefully brought together, as the katun itself remains the same in both methods. In the inscriptions the katuns are numbered from 0 to 19, using Goodman's method though not his exact nomenclature, and twenty of them equal one cycle. In the Chilan Balam books, the katuns are named as Katun 13 Ahau, Katun 11 Ahau, etc., these being the days with which they begin or with which the previous katun ended; and as after thirteen katuns the same name is again given, this nomenclature fixes a date within a period which equals 13 multiplied by the number of days in a katun. There has been a difference of opinion as to this number of days in a katun, but it is clear from the Books of Chilan Balam that their reckoning was by terms of 20 x 360 days. The followers of Perez, however, insist that the length of the katun was 24 x 365 days. Sr Perez has indeed made this assertion,[1] but he rests his opinion to a great degree on the fact that the naming of the katuns proceeded in the following order, taking their names from the day Ahau with which they began, viz.:

Katun 13 Ahau,
Katun 11 Ahau,
Katun 9 Ahau,
Katun 7 Ahau, etc.,

and that by starting with a katun which begins with 13 Ahau and counting forward a period of 24 x 365 days, we should reach another katun beginning with 11 Ahau. But the same result is brought about by considering the katun as a period of 20 x 360 days, as has been shown by Dr Seler, among others; and since the Books of Chilan Balam state distinctly that they reckon by so

[1] Stephens, *Incidents of Travel in Yucatan*, p. 441 et seq.

many scores of so-called years, and as the initial dates of the inscriptions all reckon in the same way, it is now generally considered that the katun consisted of 20 x 360 or 7200 days. An objection to considering a katun as 20 x 360 days may be raised in that the Books of Chilan Balam use the word "año" or year, but this can be easily explained by the fact that the Spanish "year" was the period which most nearly agreed with their tun or 360-day period, and that the Books did not pretend to speak with scientific accuracy.

Besides the above count, it is well known that the Mayas had a year-and-month count. This consisted in naming each one of the twenty days and in attaching to each of these days one of the numbers 1 to 13. Besides this, each day so numbered was declared to be a given day of a given month and to occur in a year marked by one of the year bearers—as for instance in the Book of Chilan Balam, already quoted, where the day is given as 9 Ymix 18 Zip in the year 4 Kan. Now this day and this year could recur only after the lapse of fifty-two years or 18,980 days.

It should be noted here that in the inscriptions and in the Dresden Codex, the day Ymix was always the day 4, 9, 14, or 19 of any month, showing that the day 1 of the month was Eznab, Akbal, Lamat, or Ben; while in Landa and the Books of Chilan Balam the day Ymix was the day 3, 8, 13, or 18, showing that the day 1 of the month was Cauac, Kan, Muluc, or Ix. That is, the months in modern times began with the day which followed the day with which the months began in more ancient times. As the tables are calculated for the inscriptions, it will be well, in order to facilitate our calculations, to call the day on which Ahpula died the nineteenth of the month Zip, instead of the eighteenth of that month.

Given that the katun consisted of 7200 days, a Katun 13 Ahau could not recur until after the lapse of 13 x 7200 or 93,600 days, and the recurrence of any day marked by the year-and-month count, and occupying any particular place in a given katun, could

not occur until after the lapse of a period which is found by finding the least common multiple of the two numbers 93,600 and 18,980. This is 6,832,800 days, which is a period of 360 calendar rounds of 18,980 days or of 52 years each. This is equal to 18,720 years, and, in the method of reckoning shown in the initial dates of the inscriptions, would equal 3 grand cycles, 8 cycles, and 9 katuns, or, to use the method of Goodman, 3.8.9.0.0.0.

I have said that a day marked by the year-and-month count, and occupying any particular place in a given katun, could not recur until the lapse of this long period. This would be true if the day was specified as being a given day in a given tun in a given katun, or even if the day was stated as falling in a given uinal of a given tun in a given katun. But in the case before us the death of Ahpula is said to have taken place in the Katun 13 Ahau when six tuns or years of that katun remained unexpired. Even with this rather loose designation such a day would not recur within a period of 3500 or 4000 years.

The day 4 Ahau 8 Cumhu seems to have been regarded as the beginning day of the beginning cycle of some grand cycle. From this day all the initial series of the inscriptions of Copan and Quirigua, of Piedras Negras and Tikal, so far as we know them, count, except one where this day 4 Ahau 8 Cumhu is itself given. In this place (on Stela C of Quirigua) 4 Ahau 8 Cumhu is reckoned thus: "Grand cycle glyph .13.0.0.0.0.", while in the Temple of the Cross it is declared to be a thirteenth cycle. As this was the beginning date, there is reason to believe that the beginning cycle of a great cycle received the number 13.

I give here the first and last terms of a list of the beginning days of the Katuns 13 Ahau in a complete round of 18,720 years occurring after the beginning of the grand cycle called by Goodman Grand Cycle 54, which began with 4 Ahau 8 Cumhu. It is of little consequence what particular number is given to the grand cycle, as the whole series forms a continuous count, and I

shall therefore follow Goodman, who gives the number 54 to the grand cycle glyphs common to Copan, Quirigua, etc.

If 54.13.0.0.0.0. or the beginning of the grand cycle, called Grand Cycle 54 by Goodman, begins with 4 Ahau 8 Cumhu, a Katun 13 Ahau will appear two katuns after this or with the count of

54.13.2.0.0.0.	13 Ahau 8 Mol	Year 10 Ix,

and other Katuns 13 Ahau will follow at intervals of 13 katuns as here given:

54.13.15.0.0.0.	13 Ahau 8 Pax	Year 6 Ix.
1. 8.	" 3 Xul	3 Cauac.
2. 1.	" 3 Kankin	12 "
. . . . .		
57.5.19.0.0.0.	13 Ahau 18 Ceh	11 Kan.
6.12	13 Uo	8 Muluc.
7. 5.	13 Yax	4 "
18.	13 Cumhu	13 "
57.8.11.0.0.0.	13 Ahau 8 Mol	10 Ix.

But we are seeking a Katun 13 Ahau in which 14 tuns have elapsed and of which 6 tuns still remain unexpired. We must, therefore, add 14 tuns or 14 x 360 days = 5040 days to each of the dates given and we shall then have the following complete list of the beginning days of Tun 14 of Katun 13 Ahau for the term of 18,720 years:

54.13. 2.14.0.0.	9 Ahau 18 Zotz	11 Kan.
15.	18 Ceh	7 Kan.
1. 8.	13 Uo	4 Muluc.
2. 1.	13 Yax	13 Muluc.
14.	13 Cumhu	9 Muluc.
3. 7.	8 Mol	6 Ix.
4. 0.	8 Pax	2 Ix.
13.	3 Xul	12 Cauac.
5. 6.	3 Kankin	8 Cauac.
19.	18 Zip	5 Kan.
6.12.	18 Zac	1 Kan.
7. 5.	13 Pop	11 Muluc.

18.	13 Chen	7 Muluc.
54. 8.11.14.0.0.	13 Kayab	3 Muluc.
9. 4.	8 Yaxkin	13 Ix.
17.	8 Muan	9 Ix.
10.10.	3 Tzec	6 Cauac.
11. 3.	3 Mac	2 Cauac.
16.	18 Uo	12 Kan.
12. 9.	18 Yax	8 Kan.
55.13. 2.14.0.0.	18 Cumhu	4 Kan.
15.	13 Mol	1 Muluc.
1. 8.	13 Pax	10 Muluc.
2. 1.	8 Xul	7 Ix.
14.	8 Kankin	3 Ix.
3. 7.	3 Zotz	13 Cauac.
4. 0.	3 Ceh	9 Cauac.
13.	18 Pop	6 Kan.
5. 6.	18 Chen	2 Kan.
5.19.	18 Kayab	11 Kan.
6.12.	13 Yaxkin	8 Muluc.
7. 5.	13 Muan	4 Muluc.
18.	8 Tzec	1 Ix.
8.11.	8 Mac	10 Ix.
9. 4.	3 Zip	7 Cauac.
17.	3 Zac	3 Cauac.
10.10.	3 Uayeb	12 Cauac.
11.03.	18 Mol	9 Kan.
16.	18 Pax	5 Kan.
12. 9.	13 Xul	2 Muluc.
56.13. 2.14.0.0.	13 Kankin	11 Muluc.
15.	8 Zotz	8 Ix.
1. 8.	8 Ceh	4 Ix.
2. 1.	3 Uo	1 Cauac.
14.	3 Yax	10 Cauac.
3. 7.	3 Cumhu	6 Cauac.
4. 0.	18 Yaxkin	3 Kan.
13.	18 Muan	12 Kan.
5. 6.	13 Tzec	9 Muluc.
5.19.	13 Mac	5 Muluc.
6.12.	8 Zip	2 Ix.

7. 5.	8 Zac	11 Ix.
18.	3 Pop	8 Cauac.
8.11.	3 Chen	4 Cauac.
9. 4.	3 Kayab	13 Cauac.
17.	18 Xul	10 Kan.
10.10.	18 Kankin	6 Kan.
11.03.	13 Zotz	3 Muluc.
16.	13 Ceh	12 Muluc.
12. 9.	8 Uo	9 Ix.
57.13. 2.14.0.0.	8 Yax	5 Ix.
15.	8 Cumhu	1 Ix.
1. 8.	3 Mol	11 Cauac.
2. 1.	3 Pax	7 Cauac.
14.	18 Tzec	4 Kan.
3. 7.	18 Mac	13 Kan.
4. 0.	13 Zip	10 Muluc.
4.13.	13 Zac	6 Muluc.
5. 6.	8 Pop	3 Ix.
5.19.	8 Chen	12 Ix.
6.12.	8 Kayab	8 Ix.
7. 5.	3 Yaxkin	5 Cauac.
18.	3 Muan	1 Cauac.
8.11.	18 Zotz	11 Kan.

The only places where a year 4 Kan appears are at the dates

55.13. 2.14.0.0.[1]	9 Ahau	18 Cumhu	Year 4 Kan, and
57. 2.14.14.0.0.	9 Ahau	18 Tzec	Year 4 Kan.

But as the words used are that 6 years (or tuns) remained before the end of the katun, and as a slightly longer time than just 6 tuns may have remained, and as the month Zip in which the death of Ahpula occurred is the third month of the year and so is near the beginning of the year 4 Kan, it is quite possible that the beginning of the Tun 14 may have been in the latter part of

[1] It is necessary to remember that, by Goodman's methods, these figures represent periods of past time. Thus the number 2 of the katun means that 2 katuns have passed, and that the current katun is what we should call the third; and that 0.0 means that a full count of uinals and kins has occurred and that the current uinal and kin are what we should call the first.

the preceding year, in which case, in addition to the preceding dates, the following date might be the one which we are seeking:

55. 9.17.14.0.0. 9 Ahau 3 Zac Year 3 Cauac.

As 9 Ymix 19 Zip is said to be in the year 4 Kan, we shall find this date before the dates of the beginning of Tun 14 in the first two cases and after the beginning of Tun 14 in the last case. This date of 9 Ymix 19 Zip will then be numbered thus, placing the three dates in consecutive order:

1)	55.13. 2.13. 3. 1.	6 tuns 299 days to end of Katun 13 Ahau.
2)	55. 9.17.14.11. 1.	5 " 139 " " " "
3)	57. 2.14.13.16. 1.	6 " 39 " " " "

In no one of the cases is the date 9 Ymix 19 Zip exactly 6 tuns before the end of the Katun 13 Ahau, but it is possible that the annalist took no account of fractions of tuns, either in excess of the 6 tuns or otherwise. Thus in the first and last cases of the three, as first given, he may have said to himself, "There are but 6 whole tuns remaining of the katun and I will call it 6," or in the second case he may have said: "There are 5 tuns remaining and 139 days besides; I will call it 6 tuns." Whichever was the plan he followed, we can have at present no means of ascertaining except from the results which we obtain by calculation.

The date found on Stela 9 of Copan, which is the earliest date of these stelæ of that place, in which the numbers preceding the period glyphs are given by the line-and-dot method, is 54.9.6.10.0.0. This precedes the above dates by the following periods:

1)	0.3.16.3. 3.1.	= 548,341 days	= 1,502 years 111 days.
2)	1.0.11.4.11.1	= 1,952,861 "	= 5,350 " 14 "
3)	2.6. 8.3.16.1	= 4,667,001 "	= 12,786 " 111 "

If, now, we accept the first date of 55.13.2.13.3.1. as the date of Ahpula's death, we shall have the date of Stela 9 of Copan as A.D. 34, since the death occurred in 1536. If we accept the second

date, 55.9.17.14.11.1., as the true one, Stela 9 must represent a date of B.C. 3814, and in the case of the third date, 57.2.14.13.16.1. in which the period to elapse to the end of Katun 13 Ahau is the nearest to an exact 6 tuns, we should throw back Copan to B.C. 11,250. It is not probable, however, that either of the last two dates is correct, both because of the immense time which would have elapsed and because the monuments show signs of no such age. We are therefore left to the date A.D. 34 as the probable date of the earliest stela of Copan which we know of at present.

The following table gives the earliest and latest dates in Copan and Quirigua as far as we know them, together with the dates of our calendar corresponding thereto, on the supposition that the above date is rightly deciphered :

Copan : Stela 9,	9. 6.10.0.0				A.D. 34.
" N,	9.16.10.0.0	= 197	years later than	A.D. 34	A.D. 231.
Quirigua : " C,	9. 1. 0.0.0	= 108 +	" earlier "	"	say B.C. 75.
" K,	9.18.15.0.0	= 241 +	" later "	"	A.D. 275.

If this is correct, Copan lasted, so far as the erection of stelæ is concerned, for about 200 years, and Quirigua for about 350 years, though of course this may be only a small part of the period of their existence.

The above calculations have been made on the supposition that the initial dates record the date of the erection of the stelæ, and on the further supposition, as has been stated, that the same principle of calculating time has been continued from the earliest ages. There is, however, some evidence that a change has been made, at least in detail. It has already been seen that the beginning day of the month has been shifted from the Eznab, Akbal series to the Cauac, Kan series of days. What difference this would have made in the relation of the year-and-month count with the long count it is impossible to say without knowing the means used to effect the change ; but it is quite likely that this relation was not affected. In the Book of Chilan Balam of Mani

is the entry: "The Thirteenth Ahau; then Pop was counted in order." And in the Book of Chilan Balam of Chumayel we find, "The Thirteenth Ahau; Pop was set in order." This statement occurs in the early part of the chronicle, and the calculation of the Ahaus goes on after it in exactly the same way as before it. This setting in order of Pop would not then seem to have made any difference in the long count. At least it is very probable that it means merely that the seasons and the calendar were made to agree.

Dr Brinton (*Maya Chronicles*, p. 85) also gives a translation of a part of the Codice Perez, which refers to the "Doubling of the Katuns." The statement is very obscure, but only tends to show that while the counting of the katuns was carried on as in the Books of Chilan Balam, the first of the series was called Katun 8 Ahau instead of Katun 13 Ahau, while the last of the series was Katun 10 Ahau. This would not necessarily change the consecutive order of the katuns, but might merely give a new starting-point.

While, therefore, it is impossible to say what change, if any, was made in the reckoning of time, it may be said that there is no evidence at present to show that the old relation of the long count to the year-and-month count and to the count of the Books of Chilan Balam did not continue to the time of the arrival of the Spaniards. Moreover, the date of A.D. 34 for the monuments of Copan and Quirigua is by no means unlikely to be the true one. At all events the above discussion of the reckoning will not be useless if it succeeds in bringing out new facts, and no one will be more ready to recognize any new evidence than I shall be, even if the above deductions shall be shown to be erroneous.

COMPLIMENTS OF THE AUTHOR

THE MAYA ZODIAC AT ACANCEH

By STANSBURY HAGAR

1867--

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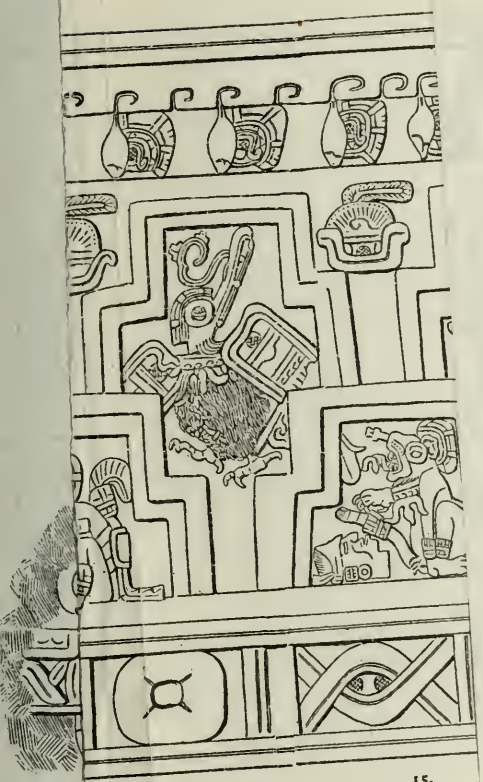

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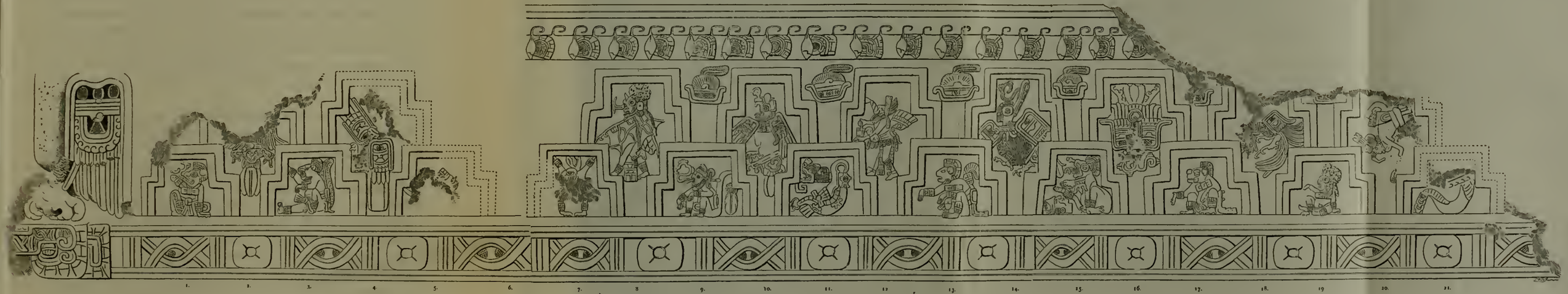

THE STUCCO FAÇADE AT ACANCEH, YUCATAN. (AFTER SELER)

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THE MAYA ZODIAC AT ACANCEH

By STANSBURY HAGAR

A FEW years ago a wall about forty feet in length and covered with figures in stucco was discovered on the northern side of a mound at Acanceh, Yucatan, one hour's rail journey westward from Mérida. The place was visited and studied by Maler, Miss Adela C. Breton, and Professor and Madame Seler. Photographs of the figures taken by the first and last named visitors are reproduced, with a carefully prepared drawing of the entire wall, in Professor Seler's paper on the subject. Miss Breton has drawn the figures in color and has also published a brief description of the remains.[1] Mrs James of Mérida has also visited and photographed them.

The inscription is divided horizontally into three parts. In the top band there is a series of alternating symbols, probably representing the butterfly, which may be solar, and the stellar eye symbol, which is conspicuous in the Mitla mural paintings.[2] In the lowest band are alternating symbols of the planet Venus and two intertwined serpentine figures which probably symbolize the year marked by the northward and southward course of the sun along the ecliptic, and its daily course above and below the horizon. But the middle band contains the most important and varied symbols. It is divided into two rows or panels, the form of which cannot easily be described (pl. XI). The lower row contains eleven human and animal figures, while the upper is composed of seven birds and two human figures. All face toward the west, or left, as is usual in Maya inscriptions. Three figures in the upper row have been completely obliterated,—one at each end of the inscription, and the fourth figure from the western end,—so there seem to have been

[1] Breton, Archæology in Mexico, *Man*, VIII, pp. 34–37. Seler, Die Stuckfassade von Acanceh in Yucatan, *Sitzungsberichte Königlich Preussischen Akad. d. Wissenschaften*, XLVII (1911), pp. 1011–1025.

[2] See Spinden, Maya Art, p. 213.

12 figures in the upper row, making a total of 23 in the middle band. In the lower row the third and fourth figures from the western end have been almost wholly obliterated. The inscription terminates at each end in the conventionalized figure of a large bird. The interstices between the panels at the top of the middle band contain sacrificial cups and feathers. The purpose of this paper is to interpret the symbols contained within the panels. Dr Seler has identified them with various animals, birds, and deities, and I accept this identification in many, but not all instances.

We shall read the symbols from east to west, or from right to left, in accord with the direction in which the figures face, reversing the numerical sequence used by Dr Seler. Beginning then with the first legible symbol in the lower line on the right we perceive the figure of a rattlesnake. *Tzab-ek*, Rattle Asterism, is the Maya name of the Pleiades in Taurus.[1] The alignment of this star group readily suggests the rattle of the snake. Above the rattlesnake, in the next compartment on the left, appears a human figure plunging downward head-first. The writer has given reasons in a former paper for identifying this figure, as it appears in a zodiacal sequence in the Dresden codex, with the double sign Aries-Taurus. It seems to represent one of a group of stars called *Tzontemoc* by the Mexicans, whose fall from heaven with the lord of the dead was commemorated in the Quecholli festival held when the Pleiades were on or near the meridian at midnight, or when the sun was in the opposite sign Scorpio ruled by the lord of the dead. Now, just at this time the Taurid meteors were most numerous in the sky. They were so called because they emanated from a point in Taurus not far from the Pleiades, so it seems probable that this falling figure represented the descent of one of these meteors.[2] In that case, the first two symbols refer to the sign Taurus.

Next to the left in the lower line is a human figure with apparently abnormal proportions, suggesting the Mexican *Xolotl*, lord of twins and of deformed and monstrous beings. He shares with

[1] Brinton, Primer of Mayan Hieroglyphs, pp. 34–35.

[2] See Hagar in *Proc. Internat. Cong. Americanists*, 16th Session, p. 284. Dr Seler thinks the face of the Acanceh figure is that of an ape. Nothing in the astronomical symbolism confirms this.

his twin brother Quetzalcoatl, the Divine Twin, the rulership of the sign Gemini, the Twins. Above him is the quetzal bird, symbol of the deity just mentioned, whom the Maya called *Cuculcan*. Therefore this second group of symbols seems to represent Gemini, the sign following Taurus in the zodiac.

Next in the lower line is a human figure with the head of a crocodile or some other amphibian. It is probably *Imix*, the eighteenth Maya day-sign. This name, according to Brinton and Förstemann, was originally *mex*, the cuttlefish, but it became corrupted and the meaning later associated itself with a crocodile or with some indeterminate sea-monster.[1] Each of the twenty Maya day-signs was assigned in sequence to a definite part of the zodiac, *Imix* to Cancer the Crab, the sign following Gemini.[2]

Above, an ara flies downward. It is the *Kinich Kakmo*, the Sun Eye and the Ara of Fire which descended from the sky upon an altar at the moment of the June solstice to consume the offerings. The sun is in the sign Cancer at this time, and the ara is perhaps the most prominent symbol of the sign. It was used by the Mexicans as well as by the Maya.[3] The symbol of speech, song, or sound that issues from its mouth answers to the Cancer Uinal or months, *Kayab*, Song, and *Cumku*, Thunder, also to the day-sign *Cauac*, one meaning of which is given as music. The reference is evidently to the season of storms, the thunder being regarded as the celestial drum.[4]

The next zodiacal sign is Leo, and in the following panel we see the unmistakable figure of a puma or jaguar which denoted that sign in both the Maya and the Mexican codices. Beside him is the severed head of a human victim. Above is a pelican in the act of swallowing its food. This bird is not elsewhere used as a Leo symbol, so far as the writer is aware, but it is sufficiently appropriate. The Maya festival of fishermen and hunters held during the uinal month *Pop*, when the sun was in Leo, supports other evidence of the association of the Maya sign with the deity of the hunt, for

[1] See Förstemann in *Bul. 28, Bur. Amer. Ethnology*, pp. 566, 567.

[2] Hagar in *Proc. Internat. Cong. Americanists*, 17th Session, pp. 140 et seq.

[3] Hagar in *Amer. Anthr.*, n. s., XV, pp. 19–23.

[4] See Seler in *Bul. 28, Bur. Amer. Ethnology*, p. 668.

the ritual of the Maya annual festivals, like those of the Peruvians, Mexicans, and the Pueblo tribes of the United States, reflected the attributes of the sign through which the sun was passing at the time when the festival was held. The pelican is a greedy fisher which takes its prey by hovering over the water and plunging upon it when it appears. These birds often fly in large flocks, and their sudden swoop upon a shoal of fish is a striking and beautiful sight. The significance of the pelican as a Leo symbol is clearly indicated in this.

The next lower panel contains an animal which may be a lizard, corresponding with the fourth Mexican day-sign *Cuetzpalin* of Virgo, though its tail does not seem to pertain to the animal named. The iguana is frequently represented in association with *Kan*, the grain of maize, Maya day-sign of Virgo. The figure in the panel above is the maize deity eating a maize cake. He is dressed in dancing costume and carries a basket which may contain tobacco, as Dr Seler thinks, or food. This is the deity who presides over the Maya Virgo asterism. The dancing may refer to harvest rites.

Under Libra, the following sign, the rattlesnake appears again beside a peculiar crescent-shaped object which I cannot identify, but which, to judge from allied symbolism, may represent the lightning or thunderbolt. The snake here stands for *Chicchan*, the serpent, the second Maya day-sign under Libra. This word may conceal the name *chuch*, scorpion, the insect which represents Libra and Scorpio in the Mexican asterisms of Tezozomoc and Sahagun, and the latter sign in the fifth Maya day-sign *Tzec* or Scorpion. Above the rattlesnake is seen an owl, the recognized symbol of the Death God A of the Maya codices who rules the death-signs Libra and Scorpio.

In the lower Scorpio panel is figured a man seated in a chair and wearing an artistic head-dress, probably indicative of high rank.[1] His open mouth, from which issues a conspicuous symbol of speech, and his protruding tongue identify him with the Chilan or oracular priest, the Mexican *Tlahtoani*, who announces the responses which he was believed to obtain from the spirits of the dead. The animal

[1] See Seler in *Bul. 28, Bur. Amer. Ethnology*, p. 380.

tail behind him may be that of a scorpion. A similar figure represents Scorpio in the Borgian and other Mexican codices. The Maya held the Chilan in such veneration that when he journeyed he was almost invariably carried in a litter.[1]

A bat is represented above the Chilan. This animal pertains to the Libra uinal *Tzotz*, or Bat, so we may be sufficiently presumptuous to suspect that the positions of the owl and the bat have been interchanged by mistake, or it may be that, as Libra and Scorpio were regarded in the codices as one double sign, care was not taken to differentiate the positions of the symbols relating to its two parts. The sign of speech or sound issuing from the mouth of the silent bat may indicate the oracular symbolism of the sign just referred to. The glyph of the evening star occurs twice beside the wings. The bat deity in the Maya codices devours the light as ruler of the subterranean cavern into which the sun sinks at setting.[2] This is probably a symbol of the autumnal equinox when darkness prevails over light and the evening star is appropriately placed with these symbols of darkness and night.

The next lower panel is partially obliterated, but what seems to be a tablet of some kind is supported upon two legs, probably of a puma, or ocelot, and at the top of the panel we seem to see the head and antlers of a stag. Both the ocelot and the stag are used as symbols of Sagittarius amongst the Mexicans, and the ocelot amongst the Maya also. *Mazatl*, deer, is the corresponding Mexican day-sign.

The long round objects to right and left should be cases of arrows or other weapons to correspond with the attributes of the war god who rules this sign. The upper panel is entirely destroyed.

Only a trace remains visible of the figure in the lower Capricornus panel. This trace includes a flame-like object which may pertain to the solsticial solar deity. Above is an unknown bird.

In the lower Aquarius panel there is the figure of a squirrel or rodent, suggesting the tenth Mexican day-sign, *Itzcuintli*, some form of rodent. But this day seems to pertain to the preceding zodiacal

[1] Landa (Brasseur ed.), p. 160.

[2] See Fewkes, God D, *Amer. Anthr.*, VIII, pp. 209, 210, 1895.

sign. The bird above may be a vulture, corresponding with the Aquarius symbol in the Borgiano and related codices.

Finally, the Pisces panel contains a frog which may represent the Virgo uinal *Uo*, Frog, as a catasterism. With it appears the glyph of the uinal twenty-day period. The spiral speech or sound symbol issuing from its mouth may refer to the noisy croaking of the frogs. The upper panel is obliterated. The inscription terminates on the east in a large conventionalized bird serpent, here, probably, symbolizing the sky deity.

We have now found symbols of nearly all the zodiacal signs in proper sequence within the panels of the middle band. Aries is missing, the figure which should represent it at the eastern end of the inscription being obliterated. Sagittarius is doubtful or completely obliterated, and Capricornus indefinite and obliterated, but the other signs are all represented, and from Taurus to Sagittarius every symbol has been identified, with a single exception. It is now a simple deduction that the sacrificial cups in the top band refer to those used in the zodiacal ritual of the monthly festivals, each festival being governed by a different zodiacal sign. And as for the planet symbol in the lowest band, the planets were naturally figured in association with the zodiac because they move only within it. The zodiac of Acanceh is unique in that its symbols are presented in a double sequence, that is with two symbols pertaining to each sign.

The symbols in the lower band may pertain to the asterisms themselves, those in the upper band to the deities governing them, as follows:

Sign	Asterism	Governing Deity
Aries	(Missing)	(Missing)
Taurus	*Tzab-ek*, Rattle Asterism	*Tzontemoc*[1]
Gemini	*Xolotl*, Lord of Twins[1]	*Cuculcan*, the Bird-serpent
Cancer	*Imix*, Water Monster	*Kinich Ahau*, Lord Sun-Eye
Leo	*Balam* or *Tzakmul*, Jaguar	Pelican Deity
Virgo	*Cuetzpalin*, Lizard[1]	Maize Deity
Libra	*Chicchan*, Serpent	Death God[2]

[1] Mexican name, Maya equivalent unknown.

[2] The positions of this and the Bat deity following should apparently be interchanged.

Scorpio	*Chilan*, Oracular Priest	Tzotz, Bat Deity
Sagittarius	Ocelot and Stag.	(Obliterated)
Capricornus	(Obliterated)	A Bird Deity?
Aquarius	*Itzcuintli*, Rodent[1]	Vulture Deity?
Pisces	*Uo*, Frog[2]	(Missing)

The Acanceh zodiac differs from that of Izamal in which each mound bore only the symbol of the sign which governed it, but it is similar to the continuous band of zodiacal symbols presented in the mural paintings at Mitla, and the Mexican or Nahuatl influence is marked throughout these symbols.

We find in this zodiac the same sequence of symbolism which the writer has presented in previous papers on the star chart of Salcamayhua and the star lists of early writers, in the plan of the city of Cuzco and in the annual ritual of Peru, in the codices and ritual, the asterisms of Tezozomoc, Sahagun, and Duran, the names of months and day-signs and the plan of Teotihuacan in Mexico and in the codices and ritual, names of months and day-signs and the plan of Izamal in Yucatan. The writer believes that he has also found this sequence and hopes later to present it in the system of *ceques*, or shrine divisions, of Cuzco, on the inscriptions at Santa Rita in British Honduras, on the wall paintings at Mitla in Mexico, and in the annual ritual of the Pueblo tribes in Arizona and New Mexico. There is also evidence that some of the Mexican and Maya temples were dedicated to zodiacal signs. And between all these sequences the correspondence of the symbolism is marked. To the writer it seems that the existence of this nearly identical sequence in the instances named must be granted by those who examine the sources of information. If this be so it indicates the wide distribution and the importance of the symbolism on which it is based. Whether this zodiacal interpretation affords a satisfactory explanation of the oft-recurring sequence, the reader must judge. But, as the writer has previously pointed out, such a series of sequences cannot be produced either by chance or imagination, nor can an explanation which consistently explains them all in proper

[1] Mexican name, Maya equivalent unknown.

[2] Virgo as a catasterism

order. And the explanation is based not on the possibility of perceiving in a certain group of stars one of the countless forms which imagination can locate there, but first upon positive evidence from star charts and lists, from ceremonials and place names, that certain forms were located in certain asterisms, and secondly on the fact that the other symbols consistently fit into the positions to which they must be assigned in the sequence, when the position of any one member of that sequence has been determined. Such is the basis on which rests the evidence of the existence and distribution of an American zodiac known from Peru to Arizona. And it should be added that the analogies between the various examples of this American zodiac are but little more striking than the analogy between it and the zodiacs of the Orient, whatever this fact may mean.

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THE AMERICAN ZODIAC

By STANSBURY HAGAR

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By STANSBURY HAGAR

IN a recent article Dr. Herbert J. Spinden states his conviction that, while the existence of a native zodiac in Central America is an open question, evidence relating to it is practically undeveloped, and the age-long fallacy of pre-Columbian introduction from Europe or apparently from anywhere else outside of America, should be dismissed.[1] He also criticises many of my papers on the subject and also those of other writers.

As the late Mark Twain wrote, it is difference of opinion that makes horse-racing, and the same cause impels me to present my opposing views for the consideration of students. I wish to establish truth, whether my present view of it be right or wrong. For many years in the *Anthropologist* and the publications of the International Congress of Americanists, I have asserted from conviction the existence of a native zodiac in America which presents a very similar aspect in Peru, Yucatan, Mexico, and among the Pueblo tribes of our own country. The existence of this zodiac is, of course, entirely independent of the question as to whether it has been derived or influenced from the eastern continent. One can accept its existence in America and deny oriental influence. My conviction is, however, that the analogies between the oriental zodiacs and the various forms of American zodiacs are too arbitrary and complex to be satisfactorily explained otherwise than by intercommunication. But I have carefully refrained from pretending to any knowledge as to when, how, or where, intercommunication occurred beyond the limitation that it was accidental and sporadic, not the result of any general migration, and that it took place at least many centuries prior to the Spanish conquest.[2]

[1] "The Question of the Zodiac in America," *American Anthropologist* (N.S.), vol. 18, pp. 53–80. Subsequent references to pages included in parentheses in the text are to this paper.

[2] Hagar, *American Anthropologist* (N.S.), vol. 14, pp. 43–48.

Therefore, I have not eliminated the possibility of communication from western Europe nor have I insisted upon the Chinese junk or the Phoenician galley which seem to disturb Dr. Spinden's equanimity, although I regard them as strong possibilities (p. 56). In answering Dr. Spinden's criticism of my papers I will not deceive myself with the belief that I can hurl thunderous phrases or heavy projectiles of opinion from the impregnable cliffs of authority and infallibility upon the forlorn hope of those attacking my views from below. On the contrary I welcome sincere criticism which seeks to establish truth by understanding and justly appreciating an opponent's views, trying to state them as that opponent would state them, and then pointing out those errors, whether of principle or detail, into which every student in a new field is liable to fall.

First, as to the existence of a zodiac in America. Perhaps the most important element in the structure of these studies is sequence. Evidence relating to the signs of the zodiac is usually found not here as to one sign and there as to another, but in direct continuous and complete sequence, occurring in many different forms of art, architecture, ceremonials, and calendar divisions. The only exceptions in the entire field are the more complex sequences of the Peruvian star chart of Salcamayhua and the plan of Teotihuacan. The identification of any two signs in one of these sequences absolutely determines the position of all the others. The symbols of all must then be consistent in the positions indicated or the identification fails. Also wherever the existence of a zodiac is suspected its entire series of symbols must harmonize throughout in continuous and unvaried sequence with the sequence of other representations of the zodiac. The harmony must be complete between the different series as a whole and between at least many of their corresponding parts. Surely it must be apparent that under such a rigid limitation it is highly improbable that a zodiacal sequence can be constructed by chance or imagination or manipulation in any form. It can only exist because it was designed to exist by some human mind. Conversely every zodiacal sequence found adds immeasurably to the improbability of accident or imaginative manipulation.

It is not possible to justify in detail the writer's claim to have shown such sequences within the limits of this paper. He can only refer to his published papers and give here the results explained in them.

In Peru the evidence is based upon five principal sequences. First there is the star chart of Salcamayhua, an Aymara or Colla Indian who wrote about 1613 "to show what these heathens thought." He is generally regarded as a reliable authority. On this chart the signs of the zodiac are depicted in three vertical columns of four signs each, every sign being three signs distant from its neighbor vertically and four signs distant horizontally.[1] Next there are the twelve wards of Cuzco arranged in a circle around the sacred city of the Inca and each bearing the name of a zodiacal sign. The purpose was to imitate upon earth the celestial design of the sky and thereby to bring down some of the perfection of the celestial world. The Skidi Pawnee of our own country today exhibit a similar concept in the arrangement of the village groups of their tribal encampment so that their relative position corresponds with the relative position of the asterisms to which their shrines are dedicated.[2] These wards of Cuzco are named and located by Garcilasso de la Vega, and, in later times, by Squier and Wiener from undoubtedly ancient tradition. Many of them are mentioned in connection with early events in the city's tradition or history.

Within Cuzco were eleven districts which also bore the names of zodiacal signs, one district having apparently been forgotten. They are mentioned by the same authorities and are arranged in a continuous meander.[3] In the outskirts of Cuzco were groups of shrines divided into ceques, so called, which also reveal zodiacal influence. Finally, the ritual of the twelve monthly festivals celebrated in Cuzco and throughout the Inca dominion presents a

[1] Hagar, *International Congress of Americanists*, XII *Session*, Paris, 1900, pp. 271–284.

[2] Fletcher, Alice C., *American Anthropologist* (N.S.), vol. 4, pp. 731–733; Dorsey, G. A., "Traditions of the Skidi Pawnee," *Memoirs, American Folk-Lore Society*, vol. 8.

[3] Hagar, *International Congress of Americanists*, XIII *Session*, New York, 1902, pp. 217–225.

zodiacal sequence which indicates that the rites of each festival were directed to the sign through which the sun was passing at the time the festival was held. This ritual is described with minor variations by almost all the early writers on Peru.[1] Blas Valera, probably the best authority on ancient Peru, writes that the Peruvians gave different powers to their zodiacal signs such as the llama, puma, serpent, and plants. Each asterism was believed to have the form of the animal or object that it governed and images were made of all these constellations. There was a temple in the Amaru Caucha district of Cuzco dedicated to the sign Scorpio in the form of a serpent or dragon holding a scorpion in its mouth.[2] Calancha also mentions the Puma asterism as a sign of the Peruvian zodiac and identifies it with our Leo. Other early writers upon Peru refer to several of the constellations included in the various sequences but seldom attempt to identify them. As yet the writer has been able to publish only an outline of the evidence bearing upon the Peruvian zodiac, but the harmony of the Peruvian sequences backed by these authorities should suffice to establish its existence.

In Yucatan the zodiacal sequences comprise drawings in the Dresden and other codices, mural inscriptions at Acanceh and Santa Rita, celestially planned cities at Uxmal and Izamal, a vigesimal division of the zodiac among the twenty Maya days of the uinal period or month and the ritual of the festivals divided among the eighteen uinals of the year.[3] The sequence is simple, direct, and practically unvaried in all cases, and here we depend much less upon tradition than in Peru because the symbols of the codices and inscriptions and the glyphs of the uinals and days provide impressive testimony independent of external authority. Yet the three oldest and best authorities upon Maya matters, Landa, Lizana,

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[1] Hagar, *International Congress of Americanists*, XIV *Session*, Stuttgart, 1904, pp. 593–602.

[2] *Relacion Anonima in Tres Relaciones de Antiguedades Peruanes*, M. J. de la Espada, Madrid, 1879.

[2] Hagar, *International Congress of Americanists*, XVI *Session*, Vienna, 1908, pp. 277–300; XVII *Session*, Mexico, 1910, pp. 140–159; XIX *Session*, Washington, 1915; *American Anthropologist* (N.S.), vol. 15, pp. 16–32; vol. 16, pp. 88–95.

and Cogolludo, contribute their share to the evidence. The explanation of Uxmal is partially dependent upon it; Izamal almost wholly so. As in Peru, the pre-columbian age of all the sequences, and their freedom from later European influence cannot be questioned. No early writer either asserts or denies the existence of a Maya or Mexican zodiac, but a number of symbols are known to represent asterisms, some of them zodiacal. Below the Acanceh inscription is a series of symbols now generally recognized as those of the planet Venus. Seler interprets others of the same planet on a constellation band at Chichen Itza as representing that planet in conjunction with a series of asterisms which must be zodiacal since planets travel only through the zodiac.[1] Spinden refers to another probably zodiacal sequence from the Codex Peresianus (p. 77). Excluding from these two sequences the symbols of Venus, the moon, and the peccary, all the other symbols have already been identified by me with definite zodiacal signs. Again, the ecliptic itself is represented as a rope with its northward and southward course correctly depicted among the symbols of the signs at Mitla, Santa Rita, and on sheet 19 of the Codex Cortesianus.

The lack of direct mention of the zodiac by early writers may be accounted for by its sacred and esoteric nature. Knowledge of it was probably always confined to the few highly instructed ones, and they exhibited little longing to teach their intolerant Spanish conquerors.

In Mexico there are numerous zodiacal sequences in the native codices, perhaps the most important being those in the Borgiano, Bologna, Vaticanus 3773, and Laud. In the three first named the governing deities of the six signs above hurl spears at the deities of the six signs below, hence the group is known as the spear throwers. Most important are the drawings and descriptions of the zodiacal asterisms in their proper sequence in the writings of Sahagun, Tezozomoc and Duran. The two former named five single and one double sign, hence six signs in all, which the Mexican king is supposed to rise at midnight to observe. They positively

[1] *International Congress of Americanists*, XVI *Session*, pp. 150–239.

identify the Mexican scorpion asterism with our Scorpio. Duran calls his asterisms planets, but as all are associated with one of the twenty-day months, they evidently pertain to the zodiac. These asterisms outnumber the planets and no planet can bear any uniform continuous relation with any month. The eighteen Mexican months and their festivals, the twenty days of the month, the celestial plan of Teotihuacan and the Zapotec mural paintings at Mitla also reveal zodiacal sequences.[1]

Among the Pueblo the monthly ritual exhibits an unmistakable zodiacal sequence, the existence of which has been definitely proven by the identification of several signs by the Hopi for me at the First Mesa in September, 1915, and the independent statements of several Hopi to me that all their rites honor the stars through which the sun is passing at the time they are performed. This adds to the testimony of archaeology and tradition the evidence of living Indians who still perform the zodiacal ritual.

Very likely there are a number of other zodiacal sequences in America which the author has not encountered, but, using the material described, he would ask: Independent of its meaning, has not the existence of an analogous sequence of symbols been shown in Peru, Yucatan, Mexico, and among the Pueblo, pervading the most important concepts of art, religion, architecture, and rites? Can this sequence be explained on any basis other than the zodiacal? Is the zodiacal interpretation of it unsatisfactory?

I will now try to answer Dr. Spinden's criticisms. In general he asserts that no first-rate authorities among the early writers on Mexico or Peru favor the existence of a native zodiac in America (p. 53). This is incorrect, as shown above. But a native zodiac could not have existed in Peru, because Garcilasso de la Vega, "our best authority on the civilization of the Inca" denies it (p. 70). Dr. Spinden apparently is not aware that the Anonymous Jesuit, who asserts the existence of the Peruvian zodiac, has recently been identified with Blas Valera, from whom Garcilasso quotes exten-

[1] Hagar, *International Congress of Americanists*, XVI *Session*, Vienna, 1908, pp. 277–300; XVII *Session*, Mexico, 1910, pp. 140–172; *American Anthropologist* (N.S.), vol. 13, pp. 229–234.

sively, and with expressions of great respect for his knowledge and learning. There is indeed a strong suspicion that Garcilasso's work is largely based on the lost work of Blas Valera, of which the Anonymous Jesuit is but a fragment. This identification was made by Dr. Gonzalez de la Rosa and was accepted by Sir Clements R. Markham. The latter describes Blas Valera as by far the greatest of clerical writers upon Inca civilization and as having qualifications and advantages possessed by no other writer. Both he and Garcilasso were half-blood Quichua, but the former wrote in Peru. His writings show an intimate acquaintance with the arcana of Peruvian religion and knowledge. Garcilasso went to Spain at the age of twenty and never returned to Peru. He was then too young to have mastered the sacred things of the Inca and he did not write of Peru till thirty-six years later, so that his negative statements are far from certain. Blas Valera rather than Garcilasso is entitled to be called the best authority on any subject he mentions.[1] Salcamayhua, a pure-blood Aymara or Colla, wrote in 1613 what Dr. Spinden terms a crude seventeenth century manuscript supported only by some priestly writings (Blas Valera and Calancha) (p. 69). But Acosta, a Spanish priest who published in 1590, is quoted with approval (p. 70). On the Salcamayhua chart I identify four signs by roundabout arguments and then assume that the rest fill out the zodiac (p. 69). Being tied down by the sequence throughout I cannot assume anything.

Because of that sequence it does not matter at what point I begin the argument. The choice is purely personal. We know nothing more of the Puma star than that it is somewhere in the heavens (p. 69). It is identified with Leo by Calancha and with a sign of the Peruvian zodiac by Blas Valera as previously stated.

The "harvest" asterism cannot be the Pleiades because they are also called "the granary." It is ridiculous to suppose that the "crude sketch" of this asterism can represent both a cloud and an ear of maize (p. 69). It is not unusual for the American Indians to delight in seeing more than one meaning in a single form; for instance, the widespread use of the castellated terrace to represent

[1] See Markham, *The Incas of Peru*, pp. 12–14, 263, 275, 278.

both clouds and mountains and the translation of Quetzalcoatl as both Bird Serpent and Celestial Twin. The Aquarius asterism is identified by means of Assyrian symbolism (p. 69). Really by the sequence, the Euphratean analogy is merely stated. The stars of Scorpio cannot present at once the figure of a tree and a mummy (p. 69). A number of people have correctly identified both for me when I only indicated to them the general section of the sky in which to look. These identifications are tenuous, the rest beyond discussion (p. 70). I cannot sincerely express regret that my opinion differs as to this; but neither opinion proves anything. There is no detailed criticism of the other Peruvian sequences.

Passing to the Mexican and Maya sequences, Dr. Spinden objects to the division of the ecliptic among four independent series of asterisms comprised of ten, twelve, eighteen, and twenty members (p. 58). The so-called series of ten does not exist. This is explained below and also in my paper, but not by Dr. Spinden. The existence of three other series would be extraordinary. A study of Duran's drawings, which seemed to furnish evidence of asterisms pertaining to the months, has convinced me that no such series existed. Duran figures the eighteen months in connection with the monthly festivals and the details of these festivals show the influence of the zodiacal sequence. Undoubtedly they were governed by the zodiacal asterisms, probably both of the normal and day signs series. But they cannot represent an independent series of asterisms because only eleven asterisms are actually represented in a series of eighteen months and an intercalary period. These asterisms are scattered irregularly among the months and it is plain that the greater number of them, if not all, pertain to the day signs series. If each month were correlated with a particular asterism surely Duran would not have omitted so many asterisms. But if the months were merely governed by certain day signs used in sequence but without correlation in time we can understand why he might not consider it necessary to reproduce them all. This reduces the Maya and Mexican zodiacal asterisms to two series, the normal and the day signs. Two independent series of zodiacal asterisms are also found in India and Arabia. I owe thanks to Dr. Spinden for indirectly suggesting this correction.

The royal asterisms of Tezozomoc and Sahagun are described as one half of a ten part zodiac derived from native books and random information from Spanish writers of the second crop (p. 58). Here Dr. Spinden might not improperly have explained that one of the five signs mentioned is interpreted as the double sign Libra-Scorpio. The figure of the scorpion which covers both these signs is so conspicuous and unique in the sky that probably the desire to retain it as a whole led the ancient Maya and Mexicans as well as the ancient Greeks to figure it in some of their zodiacs as a single constellation covering two signs. The figure is badly distorted in our curtailed constellation. The Maya and Mexicans seem to have extended its opposite constellation in similar manner, perhaps for symmetry, thus forming a zodiac of eight single and two double asterisms. These corresponded with twelve signs presenting merely a variant form of the normal zodiac. The five royal asterisms therefore covered six signs or half of the zodiac, exactly the number of zodiacal asterisms that would be visible to the Mexican king when he went out under the night sky to observe them. This may seem somewhat more plausible than Dr. Spinden's statement of the case and to whatever crop of authors Sahagun pertains we undoubtedly owe to him more valuable information relating to ancient Mexico than is afforded by any other writer.

Numerous explanations of the Mamalhuaztli asterism are given which demonstrate the uncertainty regarding its position in the sky (pp. 58, 59). None of them are supported by a sequence or correspond with other symbols having a like position in other sequences.

Tianquiztli, the Market asterism is identified with the Pleiades by Tezozomoc (p. 59). It is the only instance among the five asterisms in which the sequential interpretation compels me to oppose either Tezozomoc or Sahagun. The view that the former is mistaken in this instance is supported by the impossibility of reconciling the outline of the asterism given by Sahagun with the Pleiades and by Tezozomoc's marked uncertainty about the other asterisms except the unmistakable Scorpion. The Mexican summary supports the sequential identification with Virgo.

The five asterisms could not have formed a continuous series along the ecliptic because Tezozomoc states that the first four marked the four directions (p. 61). On the contrary all the Mexican zodiacal signs seem to have been associated with certain cardinal directions, perhaps in more than one system. One assignment was based upon a natural comparison of the daily and annual course of the sun, rising in the east at the vernal dawn of the year, attaining his farthest north at the summer solstice, receding into the west at the autumnal equinox, and departing into the south during the winter. The equinoxial signs were accordingly placed east and west and the solsticial signs north and south and each of these four major signs carried with it its neighbor on each side, thus dividing the zodiac into four triplicities each assigned to a cardinal point. The association of the Mexican and Maya years with different cardinal points is well known. Perhaps Tezozomoc mentioned the four sequential signs not as referring each to a different cardinal point but as part of the zodiac which governed all four (p. 58). We may leave the royal asterisms with a denial that Sahagun places Mamalhuaztli in Taurus (p. 61). In Book 7, Cap. 3, he identifies the Mastalejos, the same asterism, with stars "near the Pleiades, which is (are in) the sign of the Bull." [1] According to his statement they may or may not be in Taurus.

The sequence of the Spear Throwers is objected to because it is associated with certain calendrical calculations that apparently pertain to revolutions of the planet Venus (p. 61). But whether sideral or synodical I can see nothing in them inconsistent with a basic zodiacal significance supplemented by Venus periods. The influences of Venus mentioned on page 62 are exerted from the zodiacal asterisms of the day signs against their opposite asterisms whose symbolism is correctly stated in sequence thus paralleling the scheme of the Spear Throwers in the day signs sequence.

The impressive correspondence between the sequential symbolism of the day signs and that of other zodiacal series is called a monument to ingenuity (p. 62) and no reference is made either

[1] Los mastelejos del cielo, que audan cerca de las cabrillas que es el signo del toro, Lib. 7, Cap. 3.

in the text or bibliography to the additional correspondence between the zodiacal positions of the day signs as identified by me and their relations with the rainy and dry seasons as figured in the Codex Vaticanus 3773.[1]

On the Aztec Calendar Stone (p. 62) I place Cipactli of the circle of day signs at the summer solstice because it is found at the top of the circle above the central solar head corresponding with the northernmost or topmost position of the sun in its annual course. The positions of all the other signs are then determined by the sequence. This is my only venture and I consider that its correctness is strongly confirmed. It is explained in my paper but not by Dr. Spinden. The day signs are unequally distributed among the signs probably because their asterisms were of unequal size. Evidence of their association with zodiacal asterisms is furnished by the correspondence between their sequence and other zodiacal sequences, their association with zodiacal sequences in codices, inscriptions, constellation bands, and ritual, and with the rainy and dry seasons in the Codex Vaticanus 3773. The Maya day sign Manik offers additional and impressive evidence on this point in the correspondence between its meaning, the Grasping Hand, and the configuration of the tail of the Scorpion, to which asterism it must be assigned in the sequence.[2] Seler regards the nine lords of the night of the Mexican codices as probably stars or constellations.[3] Each lord is accompanied by a day sign in correct sequence and the whole represents one less than half the asterisms of the vigesimal zodiac, practically all that are visible at a given moment, and they cover exactly the same half of the zodiac as the royal asterisms of Sahagun and Tezozomoc. Why ten lords were not represented is unknown to me.[4] The argument that the discrepancy between

[1] *International Congress of Americanists*, XVIII *Session*, pp. 137–140.

[2] Hagar, *International Congress of Americanists*, XVII *Session*, Mexico, 1910, pp. 140–159; *American Anthropologist* (N.S.), vol. 17, pp. 488–491.

[3] *Codex Fejervary-Mayer*, Loubat ed., p. 48.

[4] Seler also associated the twenty day signs with twenty stars but later found possible difficulties with this point of view which I fail to understand (See *Codex Fejervary-Mayer*, p. 171). Mrs. Nuttall asserts that they constitute a native zodiac but makes no attempt to identify any day sign with any part of that zodiac. (See *Fundamental Principles*, p. 255.) Humboldt and Beyer attempt to identify the

my zodiacal identifications of the day signs and those of other students of the subject proves the error of all (p. 65) is somewhat amusing, for it is the very argument that theologians have used and still use to disprove the truth of evolution. In every new field of study divergent views are almost inevitable as to details and they continue to exist long after the main principles have been established.

The next objection is that, as the leap year error was not interpolated in the Mexican or Central American year counts, although calculated very accurately, the months thus fell behind the seasons at the rate of about twenty-four days in a century. Hence the months could not possibly maintain a close time relation with the signs of the zodiac (pp. 65, 66). Granted, but need we assume that they did? I have explained above that the months possessed no zodiacal asterisms of their own, but were probably governed both by the twelve normal signs and the twenty asterisms of the day signs, also that these asterisms governed the months in sequence but as in our own zodiac, were not correlated with them in time. The principal use of the zodiac was divinatory rather than calendrical. However, the symbolic sequence was probably established at some date when it did synchronize with the months, but the subsequent divergence was disregarded as it is by us. Facts indicate that the only direct calendrical relations of either normal or day signs zodiac were with the annual festivals and that the dates of these festivals were determined by actual observation of the stars as they still are among some of the tribes of the United States.

But the Mexican and Maya months do not coincide in time as given in my sequences (p. 67). Probably because they were correlated with the zodiac at different dates. The sequence is similar in both and that is the critical element in these studies. Their present calendrical relations are not important in this field.

Scorpion figures in the Tro-Cortesianus codex do not represent the Scorpion asterism because they are associated with pictures

asterisms of some of the day signs with different results from mine and Granados seems to assert their zodiacal basis without attempting identification (pp. 63, 64).

of hunting (p. 68). Can they be pictures of scorpions actually hunting deer? The identification of the Scorpion with Scorpio; of Scorpio with the month Tzec, the Scorpion; of the grasping hand inserted in place of the scorpion's sting with the day-sign, Manik or Grasping Hand, of the tail of the Scorpion asterism, are all described as the wildest of guesses in spite of their proper positions in the sequence.

However, I insist upon continuing my incorrigible career by adding that the Maya word *chikin*, sting sun, name of the west, refers to the sun in Scorpio in accord with the zodiacal scheme of the cardinal points explained above, hence its glyph is composed of the manik sign which represents the sting of the Scorpion, and the kin or sun sign.

Contrary to the statement on page 68 my paper on Teotihuacan is based upon personal study of the archaeological remains at that place. The genuine antiquity of the maps upon which that paper is based is vouched for by Professor Marshall H. Saville and they give a fairly accurate plan of the city.

I am unable to admit that the account of Lizana and the survey do not justify the deductions in my Izamal paper. This is again a matter of opinion, but in that paper I expressly disclaimed that all the deductions were proven.

On page 71 Doctor Spinden mentions other zodiacs unknown to me that have been "imagined" for other American Indian tribes. The late Major J. W. Powell also imagined that the festivals of various tribes of American Indians "are fixed at times indicated by the signs of the zodiac." [1]

Now as to intercommunication between the different zodiacs in America and between them and those of the eastern continent. The principal basis of the argument in favor of intercommunication is the same as for the existence of the zodiac, namely, the complex and artificial nature of the various zodiacal sequences combined with the marked analogies between all of them. No one doubts that wooden dwellings are erected by primitive peoples on different continents without intercommunication, because everywhere man

[1] Cushing, F. H., *Introduction to Zuñi Folk Tales*, p. xiv.

seeks protection from the rain and wood is usually the most abundant and easily obtained material for this purpose. Undoubtedly, many analogies in customs, languages, institutions, and rites are similarly explained as like results of like causes acting independently upon the same medium—the mind of man; but not all analogies can be thus explained. When one examines the members of the zodiacal series and realizes their artificial nature, the difficulty of explaining any one of them in the same manner for all times and places, and yet the similarity not of one or two, but of the entire series in sequence, to the writer's mind, in spite of admitted difficulties, it seems less miraculous to postulate intercommunication than to suppose that such analogies can be created by chance or by the law of like causes and like results. Probably there will be less opposition to the theory of intercommunication between the American zodiacs because of closer contiguity, racial identity, and the absence of an intervening ocean. Even Doctor Spinden asserts (p. 57) that agriculture spread from a single source over a large part of North and South America and carried with it certain ceremonies. Now the beginnings of the zodiac would probably synchronize closely with the beginnings of agriculture since it is closely associated with solar influence upon crops and this whether it is of native or foreign origin in America. Tribes of Mexican blood are now known to have been in contact with others of South American affinities near the Isthmus of Panama and Balboa heard of the Inca dominion at that point. The Maya contact with the Mexicans is an historic fact and as to the Pueblo ritual Mexican affinity or contact has been at least suspected by good authority.

The same principles apply to the question of intercommunication with the eastern continent but here, of course, the difficulties are much greater, even when confined to the accidental and sporadic communication, probably in ancient times, which alone seems possible.[1] Why did the foreigners bring only the zodiac, without food products, artifacts, or any material objects, why no religious, political, or other ideas? We must answer that as to material objects shipwrecked sailors would have none, while as to ideas

[1] Hagar, *American Anthropologist* (N.S.), vol. 14, pp. 43–48.

other than the zodiac it is by no means certain that they have not been received from the other continent; the probability lies the other way. But early navigators would be sure to emphasize the study of the stars and of the zodiac (p. 56). It is unfortunate that almost all the advocates of intercommunication have supported such ridiculous theories as naturally to prejudice the present scientific mind against the possibility of a rational defence of that view in any field, but, from the writer's viewpoint, some day the pendulum will swing back to the normal middle and this attitude will also be recognized as unscientific.

Dr. Spinden states the following objections to intercommunication: Scandinavian settlements in Greenland and communication with Labrador have left no traces upon the Northern Indians (p. 56). Granting this still uncertain statement, the northern tribes were not as receptive as the civilized peoples of South and Central America.

Analogous forms result from a unifying tendency acting upon differing sources, or convergent evolution as Dr. Spinden terms it, rather than from the opposite process or divergent evolution, therefore they did not originate from a single source. Uninitiates found phantastic theories on the former while savants confine their attention to the latter (pp. 56–57). But convergent evolution could not produce the complex zodiacal sequences.

Therefore I remain convinced of the existence of the zodiac described by me in various parts of America and of the strong probability that its correspondence with Oriental zodiacs is due to intercommunication at some time and place as yet unknown, or, possibly, at several times and places.[1]

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[1] Two other of my zodiacal papers not previously mentioned by Dr. Spinden or by me will be found in the *American Anthropologist* (N.S.), vol. 13, pp. 229–234; vol. 14, pp. 525–529.

COMPLIMENTS OF THE AUTH

THE MAYA DAY SIGN MANIK

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By STANSBURY HAGAR

1869

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THE MAYA DAY SIGN MANIK[1]

By STANSBURY HAGAR

IN two former papers the writer has marshalled evidence that the twenty Maya and Mexican day signs represent in sequence twenty constellations located around the circle of the ecliptic or zodiac. In the first paper this deduction was based upon the continuous correspondence between the symbolism of these day signs and that of the month signs, the monthly ritual and the various sequences of zodiacal constellations found in the codices and in the writers of the period following the Conquest, especially Tezozomoc, Sahagun, and Duran. In the second paper the deduction was supported by the correspondence between the rainy and dry seasons on the Mexican plateau and the position of the day signs with respect to these seasons as figured and symbolized in the Codex Vaticanus 3773.[2] A third verification of the deduction and of the identification of each day sign with a certain zodiacal constellation may be found in the correspondence between some of the names of the day signs and the alignment of the star groups to which they must be assigned in the sequence. The Maya day sign, Manik, offers perhaps the most impressive correspondence of this nature. Its glyph presents the figure of a hand closed as if in the act of grasping, and Dr Seler interprets it as giving in a gesture the invitation to eat[3] (fig. 87). Diverse meanings have been attributed to its name but Dr Brinton's explanation of it as "a hand that grasps" from *mach*, to grasp, seems most consistent.[4] Astro-

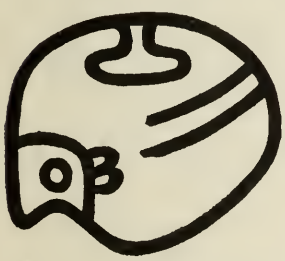

FIG. 87.—Manik Glyph, Dresden Codex, p. 4c.

[1] Read before the American Anthropological Association at Philadelphia.

[2] Hagar, *Int. Cong. of Americanists*, 17th Sess. (Mexico), pp. 140–159; 18th Sess., pp. 137–139.

[3] Seler, *Bu. of Am. Ethnology*, Bull. 28, p. 30.

[4] Brinton, *Primer of Mayan Hieroglyphs*, p. 111.

nomically, this day must be assigned to the eastern portion or tail of our constellation of the Scorpion for the symbolism indicates that the preceding day sign must pertain to Scorpio and the following day signs to Sagittarius. Two variants of the Manik glyph in the Books of Chilan Balam present the conventionalized tail and sting of the scorpion.[1] Now a glance at the alignment of the stars of the Scorpion's tail (ϵ to ν) should disclose the plainly marked figure of the grasping hand. But we need not depend upon our imagination in this instance. The Maya recognized the Zinaan ek or Scorpion asterism.[2] We know that they had so named it in pre-Cortesian times because it is figured in the pre-Cortesian codex Tro-Cortesianus. It is also seen in the wall paintings at Mitla; it is associated with the Maya deity, Ek chuh, Black Scorpion or Star Scorpion; and it is named by Tezozomoc and Sahagun amongst Mexican constellations which show no trace of European influence. We know that it must be identified with our own constellation of the Scorpion because of its position in the sequence of these constellation symbols, because the Maya Uinal period, Tzec or Scorpion, corresponds in time with the entrance of the sun into this sign, and because Sahagun asserts this identification. Indeed the stars of Libra and Scorpio present the figure of a scorpion so unique and conspicuous in the sky as to justify as at least probable an assignment to it without further evidence, of all asterisms bearing the name of that insect.[3] If now we examine the representation of the scorpion

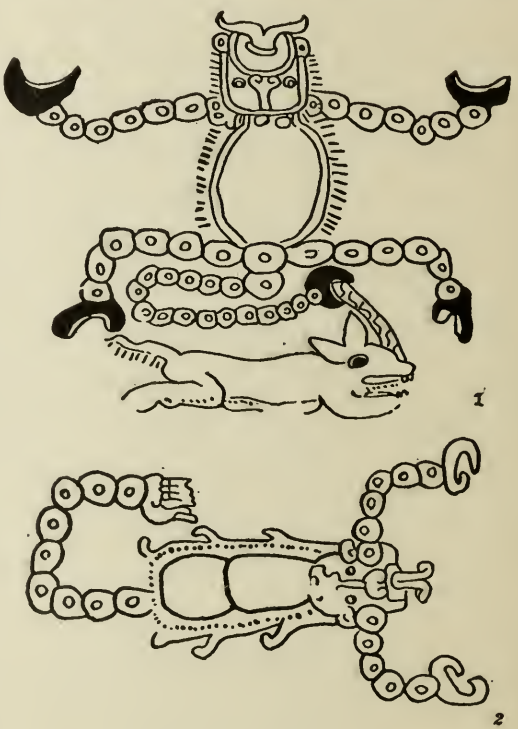

FIG. 88.—The Scorpion in the Codex Tro-Cortesianus (after Tozzer and Allen).

[1] See Bowditch, *Maya Numeration*, Plate II, Nos. 10, 11.

[2] Brinton, work cited, p. 75.

[3] Cf. Hagar in *16th Sess. Int. Cong. of Am.*, pp. 278–291–292.

on page 48c of the codex Tro-Cortesianus we shall observe that a grasping claw has been substituted for the sting at the tip of the tail. On page 44c of the same codex the sting is replaced by a human hand with fingers closed as in grasping. In fact in the Maya codices the tail of the scorpion usually terminated in a grasping organ (fig. 88).[1] In the first representation the object grasped is a rope to which a deer is fastened below. This is the zodiacal rope or the ecliptic similarly figured at Mitla, Santa Rita, and on page 19 of the same codex. The deer is the symbol of the opposite sign, Taurus, correctly placed with respect to the Scorpion.

Thus we are led to the conclusion that the day sign, Grasping Hand, owes its name to the configuration of the stars of which it was the symbol. Its glyph, contrary to the usual position of Maya glyphs, is horizontal in accord with the aspect of those stars.

Perez gives "that which was" as a possible meaning of Manik and Brasseur de Bourbourg "the breath has passed."[2] These meanings harmonize very well with the predominant death symbolism of the Maya Scorpio asterism which is associated with the death god, death head, and with the day sign, Cimi, which precedes Manik and has the meaning, dead. Possibly therefore, like the sting of the scorpion which it replaced, Manik was supposed to symbolize the hand of death, and to be pulling the sun downwards into the darkness and death of the winter. But if it was connected with death it certainly also represented resurrection in contrast with the death symbols preceding it.

At Izamal we seem to see a reflection of the Grasping Hand in the temple called Kabul the Working Hand, dedicated to the sign Scorpio. This edifice is said to have contained the image of the hand with which the death god healed the sick and restored the dead to life. Another reflection of this miraculous hand is apparently found in the Maya festival Chich Caban, the Calling Down of the Great Hand. This ritual was celebrated on the last day of the Scorpio uinal or month Xul or End but it evidently pertained to the following uinal Yax Kin. This uinal was also

[1] Tozzer and Allen, *Animal Figures in the Maya Codices*, pp. 305–306, Plate 4.

[2] See owditch, *Maya Numeration*, p. 263.

governed by Scorpio and it held exactly the same position amongst the uinals as did Manik amongst the day signs. In this ritual the Maya celebrated the return to earth of their principal deity Cuculcan who was believed to have ascended to the sky amongst the gods during Xul. The myth probably refers to his death and resurrection, for Xul is the symbol of death and Yax Kin of returning life.[1]

Again, the deity Ek Chuh, who occupies the position of Scorpio in the so-called spear-throwers group on page 49 of the Dresden Codex, holds his right hand in the position of the Manik symbol.

Finally, though this is admittedly speculative at present, there may be some connection between this symbolism and that of the mysterious impress of the human hand so often found upon the walls of Maya temples. Was it a prayer to the Death God for restoration of health or preservation of life?

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[1] See Hagar, *Am. Anthropologist*, N.S., Vol. XV, pp. 17–18–24–31.

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